PART 2

REPORTS OF THE CONSULTANTS

TRANSIT AND PEDESTRIAN ORIENTED NEIGHBORHOODS

Design Study

A STRATEGY FOR COMMUNITY BUILDING IN MONTGOMERY COUNTY, MARYLAND

ANALYSIS OF CASE STUDIES, IDENTIFICATION OF PRINCIPLES, AND DEVELOPMENT OF GUIDELINES AND STANDARDS FOR TRANSIT AND PEDESTRIAN ORIENTED NEIGHBORHOODS IN MONTGOMERY COUNTY, MARYLAND.

The Maryland-National Capital Park & Planning Commission
MONTGOMERY COUNTY PLANNING DEPARTMENT
URBAN DESIGN DIVISION
8787 Georgia Avenue, Silver Spring, Maryland, 20910-3760

DRAFT REPORT

ABSTRACT

TITLE: Part II: Reports of the Consultants
Transit and Pedestrian Oriented Neighborhood Study

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ABSTRACT: This document represents Part II of the Transit and Pedestrian Oriented Neighborhood Study. It includes six reports that summarize the work of the consultants selected to assist the M-NCPPC in the preparation of the study. Part II is intended to provide background material for the study and provide important information for use in the preparation of implementation strategies.

Analysis of the Early Transit Oriented Neighborhood: Toward a New Strategy of Community Development

ANALYSIS OF THE EARLY TRANSIT ORIENTED NEIGHBORHOOD: TOWARD A NEW STRATEGY FOR COMMUNITY DEVELOPMENT

John A. Carter

Fall 1989

OUTLINE

I. INTRODUCTION

A. Locational Choice

Increases in mobility and wealth have expanded the choices for residents within cities and suburbs. This has led to a highly competitive atmosphere between jurisdictions within large metropolitan areas for retaining existing and attracting new residents.

Jurisdictions and neighborhoods are extremely vulnerable to being found as unattractive by potential residents. Existing residents of neighborhoods are susceptible to the locational choices by others which may threaten their residential investments, physical safety, mobility, and environmental quality.

The probability that some local neighborhoods will benefit more than others is apparent in this competitive situation. In this highly competitive environment, local government leaders should consider the elements of successful neighborhoods in establishing public policy.

Suburban jurisdictions and neighborhoods are often the location of choice for many of the highly mobile and wealthy individuals. The result of these locational preferences has been the general declining of cities and thriving of suburbs. The continued success of suburban jurisdictions will depend on how attractive they remain as places to live for current and potential residents.

B. Purpose of This Paper

Prior to the widespread use of the automobile, developers of residential neighborhoods had to provide access to public transit and to establish a unique physical form to attract potential residents to suburban locations. As a result, several highly successful neighborhoods were created prior to the advent of the automobile that remain attractive today. Recent designers and private developers are increasingly influenced by the grid pattern of streets, walkable environments, human scale, and convenient shopping found in these early transit oriented neighborhoods. The purpose of this paper is to analyze the key aspects of successful early transit oriented neighborhoods, compare these aspects with other neighborhoods, and identify urban design elements and policies that would create successful future transit oriented neighborhoods in Montgomery County, Maryland.

The theme of this paper is that design features such as street layout, orientation of buildings, and setting are factors in reducing dependence on the automobile and creating transit oriented neighborhoods. In addition, many of these design features create highly desirable neighborhoods that have remained attractive over time to existing and potential residents. Understanding the design elements that provide attractive and transit oriented neighborhoods will provide a background of information that will assist local governments in encouraging the creation of neighborhoods that are attractive to existing and potential residents.

II. IDENTIFICATION OF EXISTING PROBLEMS

A. Context of Declining Cities and Thriving Suburbs - The Need for New Strategies of Neighborhood Development

Geographically expanding land development opportunities, inexpensive fuel and more fuel-efficient automobiles, expansion of transit options, trickle-down processes for housing low-income persons, families preferring suburban to city locations, and dispersal of employment and retail stores within suburban areas have all contributed to the thriving of suburban areas and the declining of cities. For purposes of this discussion, increases in family income and median value of homes are the major statistical indicators of a thriving neighborhood.

These differences between city and suburban areas create a strong motivating influence on individual decisions. As these socio-economic influences between cities and suburbs increase, individuals are more likely to find secure home ownership opportunities and investments, physical safety, and good schools in the suburban areas.

For the older suburban areas, these differences are likely to be temporary. As the housing in older suburban areas begins to age, the trickle-down process of neighborhood change will likely occur (Downs, 1981). This process is the outward movement of wealthier households from older, often deteriorated housing to the expanding edges of metropolitan areas. These wealthier households are replaced by lower-income households with limited choice. In the older suburbs, this trickle-down process is being exacerbated by additional problems. Intense growth pressures are destroying the natural landscape, not only creating stress in the natural environment, but stripping away one of the basic attractions of suburban life (Barnett, 1989). Traffic congestion is reducing mobility for the suburban resident. The existing pattern of streets and pathways that omits sidewalks and creates cul-de-sacs encourages isolation of uses and dependence on the automobile.

Public policy should be directed toward the creation of new strategies for neighborhood development. Without the development of an adequate public policy, older suburbs are likely to decline in the same manner as cities.

B. Transportation as a Constraint in Montgomery County

Public policy established by state government in Maryland requires that the road system in Montgomery County be adequate to serve the needs of development before construction is completed. As a result of these policies, severe limitations to additional development are presently in place throughout Montgomery County. Resources are not available to substantially increase the size of the existing road network. Existing growth management policies direct development away from rural areas and to corridors served by an existing transportation network. A network of rail and bus transit facilities is already available in Montgomery County that could reach into many undeveloped and existing growth corridors without a major financial burden to create new road systems. The creation of new neighborhoods and the improvement of existing areas in a manner that would include the physical aspects of these early

successful transit oriented neighborhoods will potentially reduce dependence on the automobile and therefore reduce the need to construct new roads.

III. METHODOLOGY

A. Unit of Analysis

The unit of analysis for this study will be the residential neighborhood. The examples to be used vary in size from 150 to 350 acres.

B. Evaluation Research Methodologies

The major evaluation research methodologies will include the following:

1. Graphic and Written Description of the Physical Characteristics of Successful Transit Oriented Neighborhoods

   The physical characteristics including street pattern, pedestrian connection, building orientation, mix of uses, and access to transit of successful transit oriented neighborhoods will be identified. The examples of these neighborhoods will include:

   a. U.S. Prototypes

      - Riverside - Chicago, Illinois (railroad neighborhood)
      - Roland Park - Baltimore, Maryland (trolley neighborhood)

   b. Early Montgomery County Examples

      - Garrett Park (railroad neighborhood)
      - Kensington (railroad neighborhood)
      - Chevy Chase Village (trolley neighborhood)

2. Statistical Comparison of Neighborhoods

   Statistical aspects of three successful transit oriented neighborhoods will be compared with three adjacent non-transit oriented neighborhoods, and three non-adjacent and non-transit oriented neighborhoods that lack the design attributes of successful transit oriented neighborhoods. An outline of the neighborhoods follows:

   a. Transit Oriented Neighborhoods

      - Garrett Park
      - Kensington
      - Chevy Chase Village

   b. Adjacent Non-Transit Oriented Neighborhoods

      - Randolph Hills
      - Rock Creek Palisades
      - Sumner

c. Non-Adjacent and Non-Transit Oriented Cul-de-Sac Neighborhoods

- o Montgomery Village
- o Germantown
- o Olney Manor

d. All Montgomery County Neighborhoods

Census Records from 1960 to 1980, and 1987 Census Update Records provided by Montgomery County will be used.

Household characteristics such as age of housing, age of householder, household income, and price of housing will be compared over approximately three decades. Length of residence and use of transit in 1987 also will be compared. The hypothesis is that the transit serviceable neighborhoods have retained many positive characteristics over time that contribute to the success of these areas when compared with other neighborhoods or Montgomery County in general.

IV. ANALYSIS OF SUCCESSFUL NEIGHBORHOODS

This section of the paper will analyze successful, transit oriented neighborhoods. The first section provides a written and graphic description of two prototypical neighborhoods in the United States, and three local neighborhoods. The emphasis on local neighborhoods allows direct observation and improved access to data. The second section provides a comparison of the three local neighborhoods with three adjacent neighborhoods that are not transit oriented, and three cul-de-sac neighborhoods that lack the design attributes of successful, transit oriented neighborhoods.

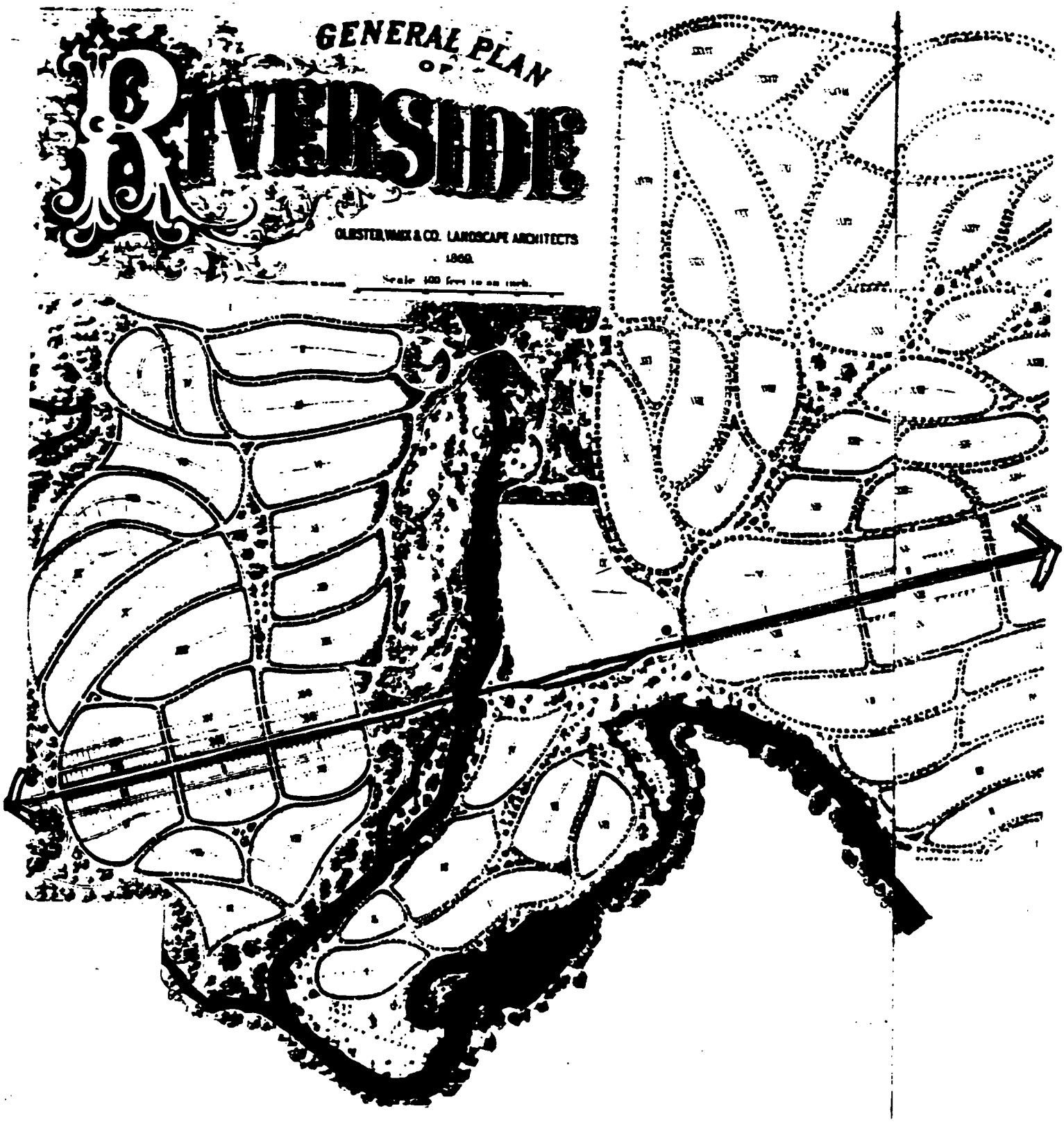
A. Graphic and Written Analysis of Early Transit Oriented Neighborhoods

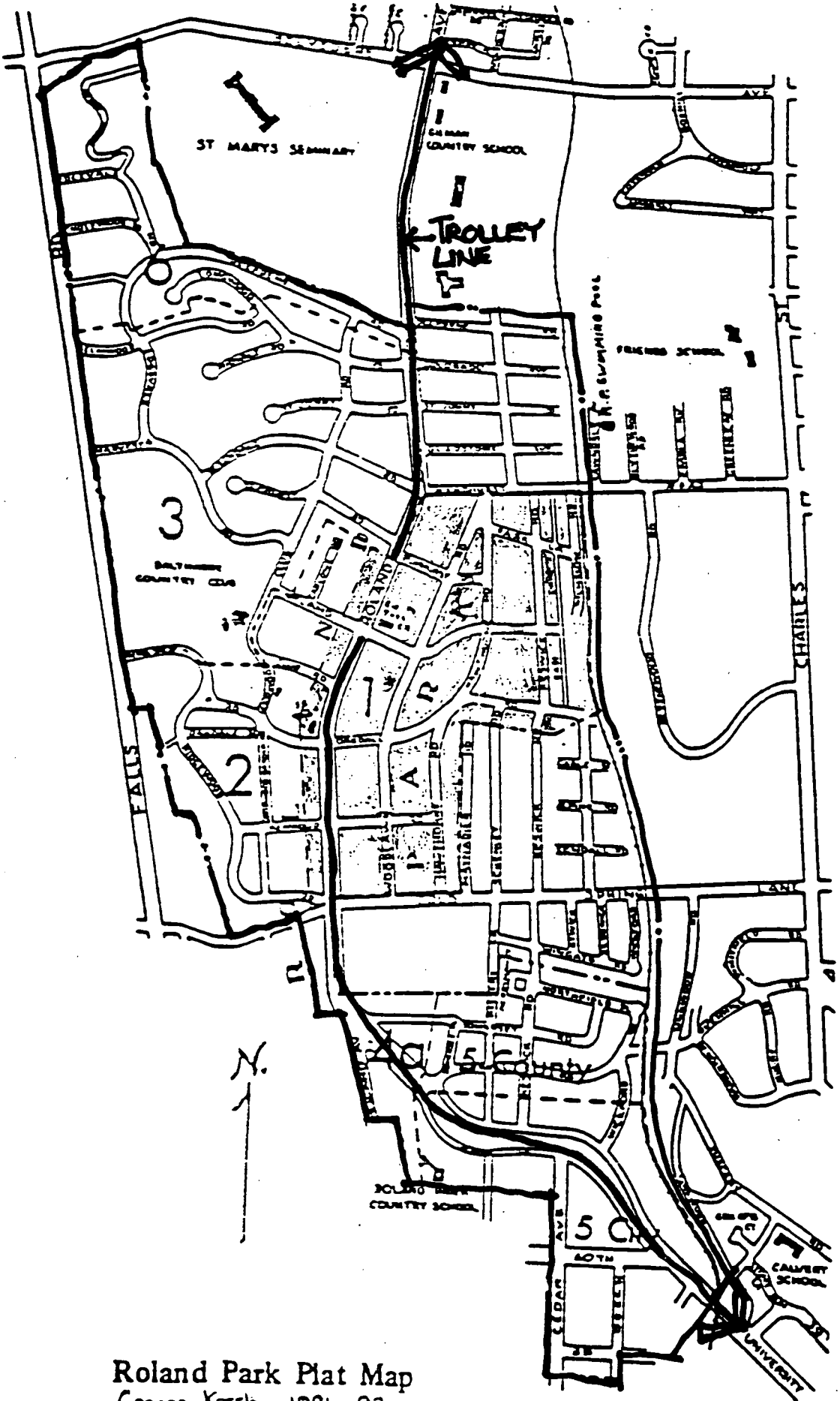
Numerous examples of early successful transit oriented neighborhoods can be found throughout the United States. This section of the paper will discuss the early railroad and trolley suburbs using Riverside, Illinois, and Roland Park, Maryland, as examples. Three local examples in Montgomery County will also be examined in greater detail.

1. U.S. Prototypes of Railroad and Trolley Suburbs - Riverside and Roland Park

As early as 1836, the wealthy began to desert their old urban houses for more fashionable portions of the city or the suburbs (Stilgoe, 1988). The invention of the railroad and trolley facilitated the movement to the suburbs prior to 1900.

The railroad suburb of Riverside, near Chicago, Illinois, and the trolley suburb of Roland Park in Baltimore, Maryland, are two examples of early transit oriented suburbs. The design elements established in these prototype suburbs were used in the design of later suburbs (Stern, 1981). The maps on the following pages delineate the characteristics of Riverside and Roland Park.


GENERAL PLAN
OF
RIVERSIDE
OLMSTED, VAUX & CO. LANDSCAPE ARCHITECTS
1868.



Roland Park Plat Map
George Kessler 1891 - 93

The plan for Riverside was completed by Frederick Law Olmstead and Calvert Vaux in 1869, and reflects one of the earliest examples of a large-scale railroad oriented suburb. The interconnected system of curvilinear streets reflects the influence of the "picturesque movement" that dominated design theory later used in the plan of Garrett Park (Ciucci, 1979).

In contrast to the curvilinear streets in Riverside, the suburb of Roland Park contains a more rigid grid system of streets with only minor modifications to accommodate topographic constraints. The plan for Roland Park was developed over two decades by George E. Kessler, the Olmstead brothers, and developer Edward H. Bouton. The entire development remains an attractive and stable neighborhood today. The modified grid system of streets, mix of uses, the park-like setting, and the attention to sidewalks throughout the suburbs are the prominent features found in the trolley suburb of Roland Park.

The design aspects of these early suburbs were of great importance in attracting wealthy residents. The integration of trees and landscape was a dominant feature in the design of the successful railroad and trolley suburb. Integration of landscape in design was often equated with healthy individuals, moral necessity, and the feeling of security (Stilgoe, 1988). Through new levels of neighborhood design, private developers expected to reach new levels of profit. The design and arrangement of streets, structures, and the integration of landscape were all carefully considered to attract people with even moderate means. The important design principles developed by Olmstead and others to create successful railroad and trolley suburbs include the following:

1) main thoroughfares should be direct, ample, and convenient no matter how they cut the land;

2) all other roads must be quiet, attractive residential streets and designed to discourage use as thoroughfares and narrow enough to increase lawn area;

3) absolute necessity of parkland - often 3-1/2 acres of green within view of the railroad station along a central boulevard;

4) high standard of design and construction of all buildings erected;

5) creation of a strict town code to enforce setbacks and minimum cost of homes (Stilgoe, 1988).

6) grid system of streets with adjacent sidewalks to provide access to the railroad station or trolley stops.

2. Early Examples of Transit Oriented Neighborhoods in Montgomery County, Maryland

Riverside, Illinois, and Roland Park, Maryland, are nationally recognized examples of railroad and trolley suburbs (Stern, 1981). The lessons learned from nationally-recognized railroad and trolley suburbs were applied to opportunities in other metropolitan areas throughout the United States. At least two railroad suburbs and one trolley suburb are located within the boundaries of Montgomery County, Maryland. These neighborhoods include Kensington and Garrett Park as railroad suburbs, and Chevy Chase Village as a trolley suburb.

The Metropolitan Branch of the B&O Railroad was extended from the center of Washington, D.C., through Montgomery County to Point of Rocks in 1873. Prior to this date, Montgomery County consisted of a few small farming communities. The suburban rush from Washington, D.C., had not yet begun. Electric trolleys were extended into Montgomery County from Washington, D.C. beginning in 1890. Private land developers were responsible for extending trolley service along Connecticut Avenue.

Soon after the Metropolitan Branch of the B&O Railroad and the electric trolley were extended through Montgomery County, private land speculators began the creation of new suburban communities to take advantage of outward migration from Washington, D.C. From 1888 to 1891, the communities of Kensington, Garrett Park, and Chevy Chase Village were recorded in the land records of Montgomery County. These suburbs were planned to take maximum advantage of the filtering from the older inner city neighborhoods to new suburban locations by higher income persons. Security of residential investment, environmental quality, and mobility were emphasized in the design of these neighborhoods. Each of these communities provided direct access to jobs in the central city of Washington, D.C. Successful design principles established in the prototypical railroad and trolley suburbs such as Riverside, Illinois, and Roland Park, Maryland, were incorporated into these neighborhoods. A description of the two railroad suburbs and the trolley suburb follows.

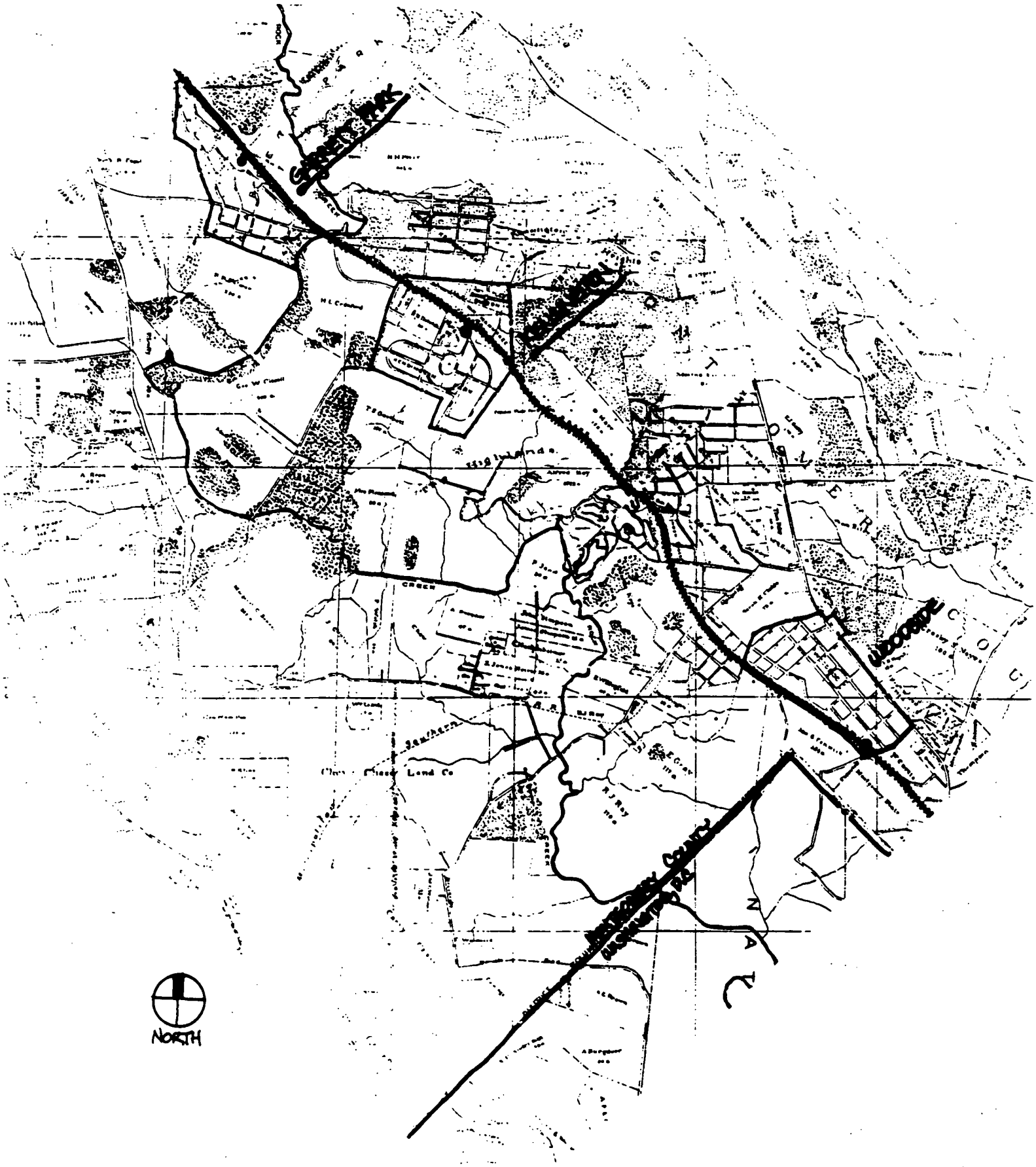
a. Kensington - Railroad Oriented Neighborhood

In the early 1890's, a real estate promoter, B.H. Warmer, developed a railroad suburb with streets and lots, a church, post office, and services named Kensington, after the suburb of London, England (M-NCPPC, 1978). Kensington grew rapidly. Several design elements were used to attract the early residents from the inner city including the following:

1) modified grid system incorporating several circles to create a distinctive pattern of streets;

2) generous setbacks for all buildings;

MONTGOMERY COUNTY
C. 1900



3) attractive brick sidewalks were used to create access to the commuter rail station;

4) distinctive Victorian architecture;

5) park areas and special attention to the use of trees and landscaping.

The town was incorporated in 1894.

b. Garrett Park - Railroad Oriented Neighborhood

The Garrett Park neighborhood was the next stop on the B&O Railroad. The winding streets and irregularly-shaped lots were the most distinctive design feature of this plan. The landscape architect responsible for the neighborhood plan was acquainted with Olmstead and the plan of Riverside, Illinois. A post office, town hall, a major park with a pavilion, and small school were incorporated into this community. The existing Rock Creek and elaborate plantings of native trees to shade and ornament the streets were key natural features incorporated into the plan (Johnston, 1974). As in Kensington, this neighborhood quickly attracted wealthy residents from existing inner-city neighborhoods that were in search of secure home ownership opportunities in the suburbs.

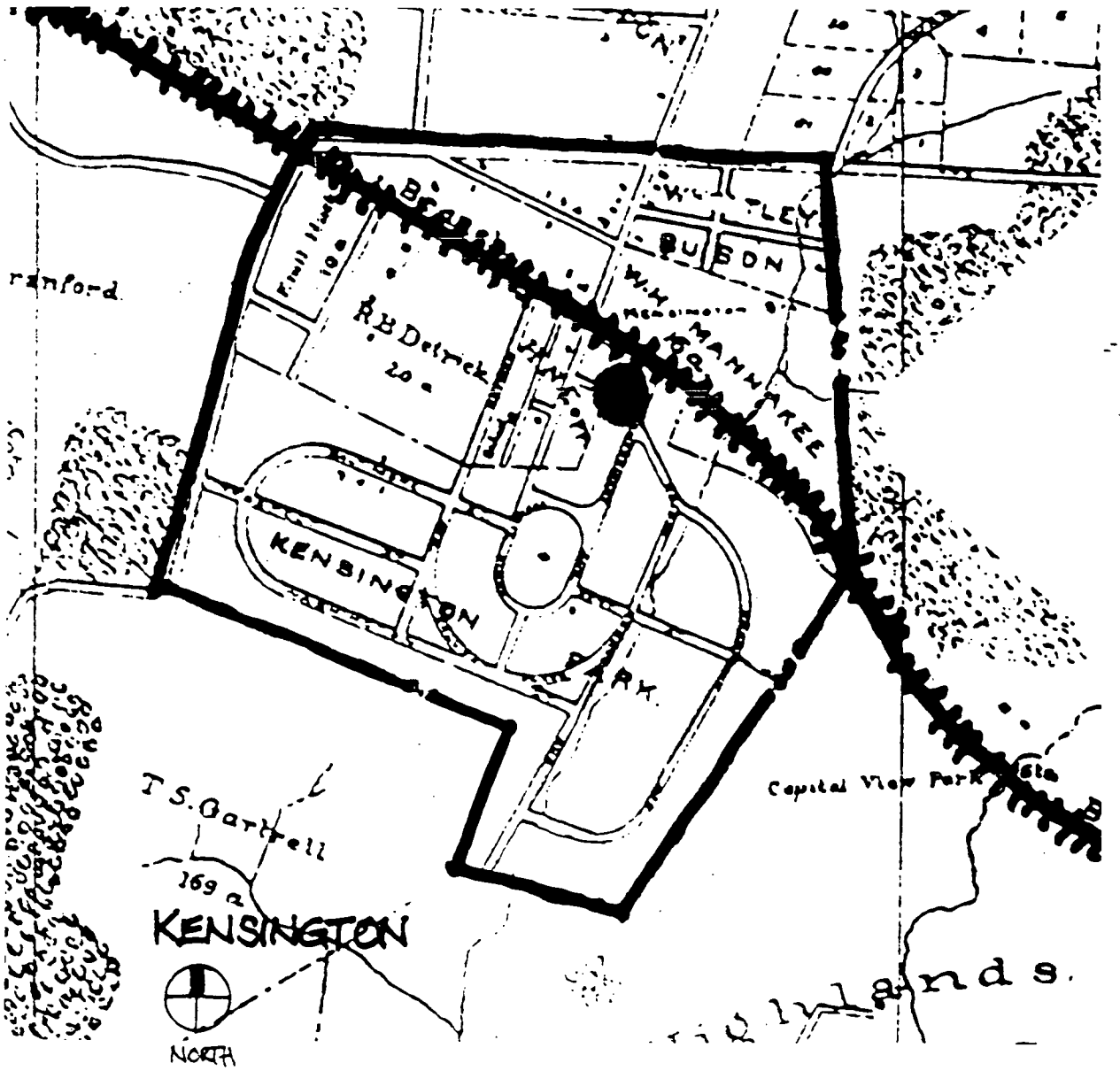
c. Chevy Chase Village - Trolley Oriented Neighborhood

In contrast to the railroad suburb which was oriented around a single station, the trolley suburb allows the neighborhood to be oriented around several stops along a central street or boulevard. Chevy Chase Village was part of an initial purchase of more than 1,700 acres of farmland by the Chevy Chase Land Company. Construction of Connecticut Avenue for over five miles, and the creation of a trolley line to connect this neighborhood to the center of Washington, D.C. was part of the initial phase of development. The establishment of clubs, churches, schools, commercial uses, and open spaces to serve the needs of the residents was an important feature of this community. Houses of all sizes were constructed. The the intent was to use the highest quality standards. The first section was opened in 1893 (Smith, 1988). Many of the concepts established in Roland Park were applied to Chevy Chase Village. These concepts included:

1) hierarchy of streets such as the broad Connecticut Avenue, internal parkways, and narrow residential streets;

2) careful attention to the environmental setting including sidewalks, street trees, and appropriate building setbacks;

3) distinctive architecture.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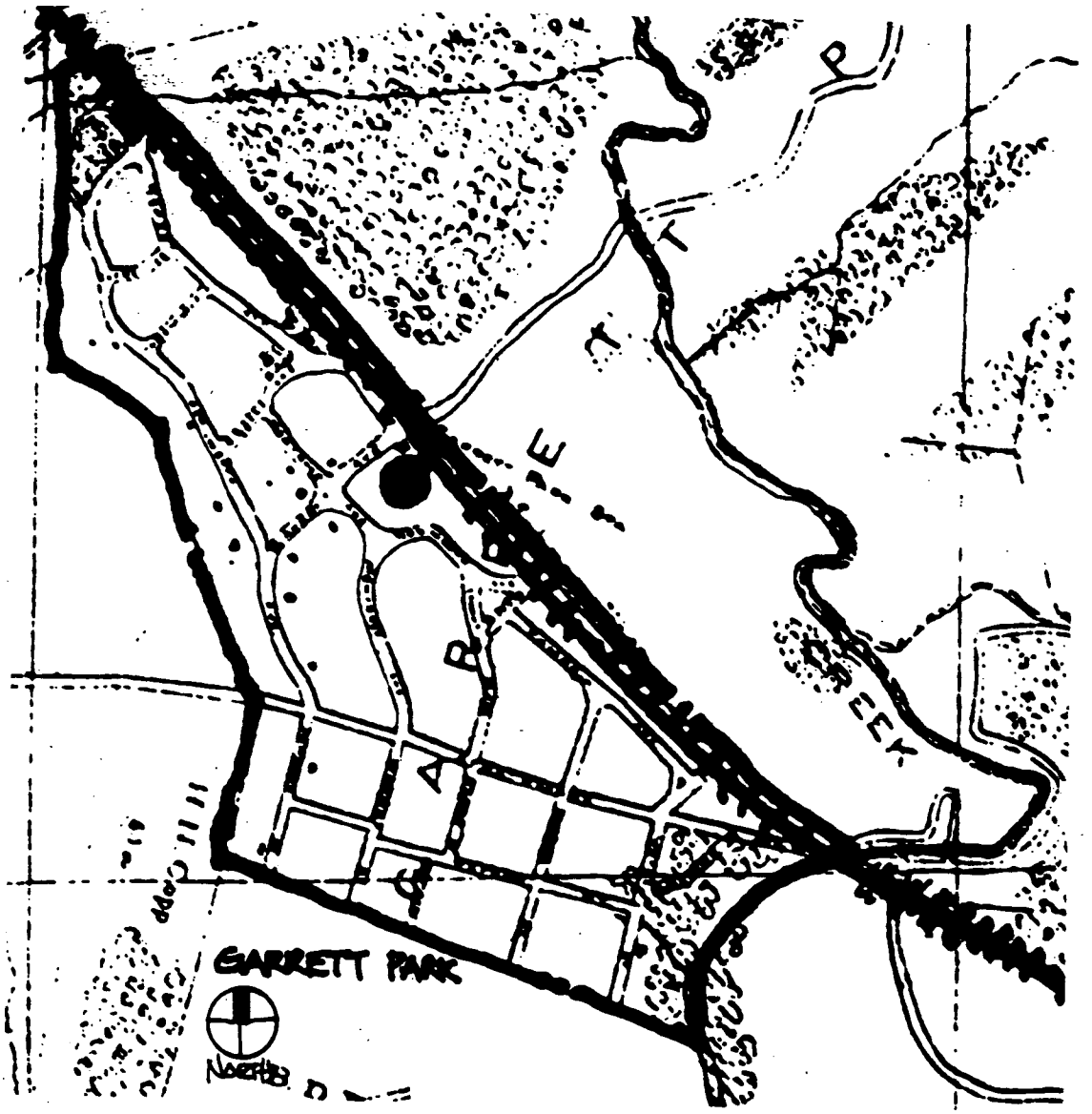
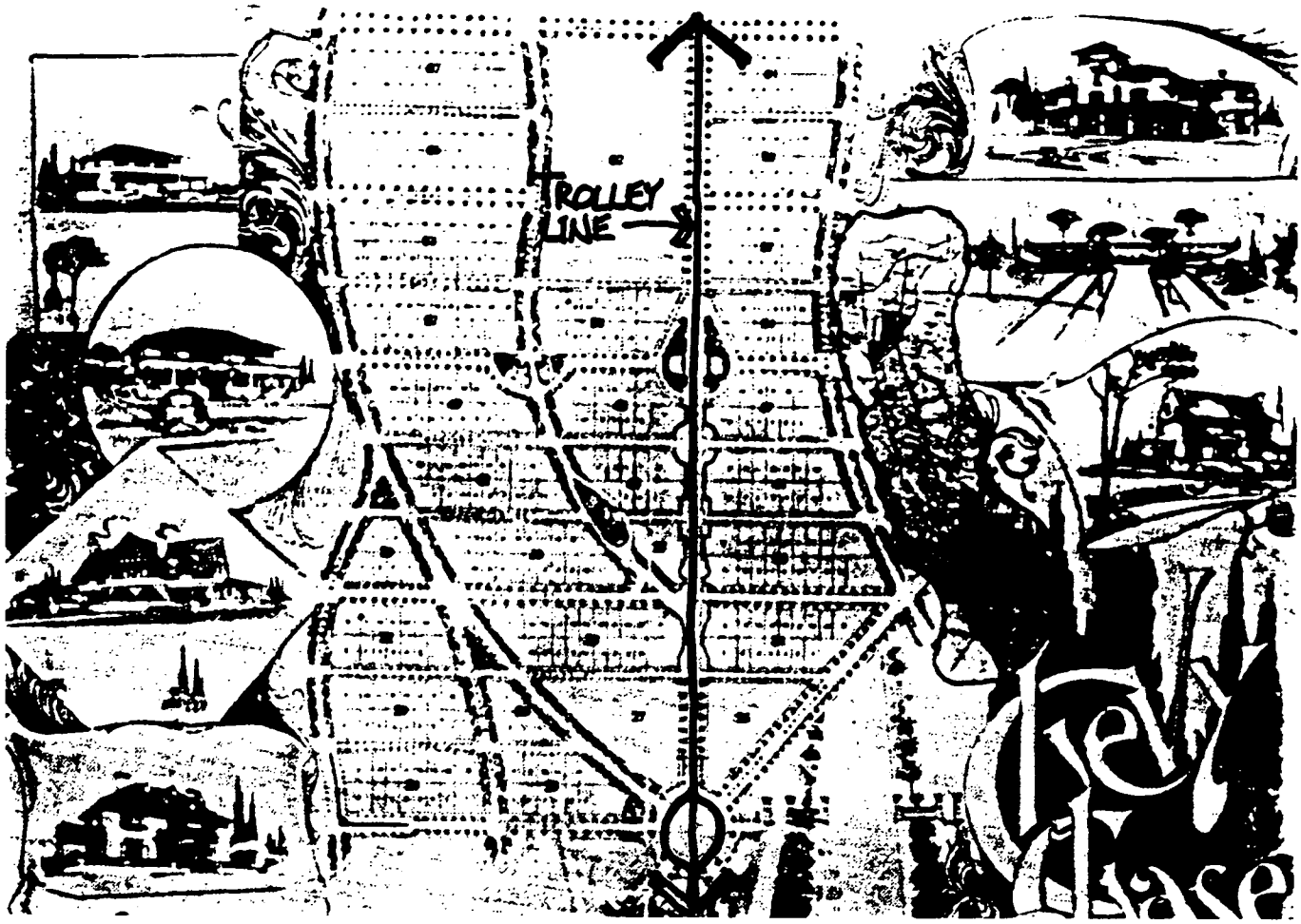
20
KENSINGTON
PARK
T S. Garrell
169 a
KENSINGTON
NORTH
Capital View Park
Highlands.


GARRETT PARK



CHEVY CHASE VILLAGE

This trolley oriented neighborhood was included because the concepts could be applicable to light rail or bus transit in use today.

In summary, Kensington, Garrett Park, and Chevy Chase Village are examples of successful railroad or trolley suburbs. Early residents of these neighborhoods were often higher-income professional and government workers who moved from older inner-city neighborhoods. The railroad and trolley allowed easy access to jobs and service in the central area of Washington, D.C. The private developers of these neighborhoods were careful to offer secure home ownership opportunities and investments. Urban design was carefully considered in these neighborhoods to attract potential residents. The major design elements included:

1) an interconnective system of streets in modified grid patterns;

2) a walkable pedestrian environment;

3) careful attention to parks and landscaping;

4) distinctive architecture with specific design controls for setbacks and size of housing.

These design elements were used to generate feelings of confidence and security of investment for potential property owner.

The chart below provides information on each of these suburbs today.

COMPARISON OF DEVELOPMENT STANDARDS

Name	Kensington	Garrett Park	Chevy Chase Village
I. Tract Area (Acres)			
A. Residential (including parks, schools, and streets)	154	145	287
B. Commercial	38	2	N/A
C. Total	192	147	287
II. Residential Mix			
A. Multi-family	160 (38%)	N/A	N/A
B. One-family detached	266 (62%)	352 (100%)	694 (100%)
C. Total	426	352	694
III. Commercial Floor Area	387,150	41,000	N/A
IV. Residential Density (dwelling units/acre)	2.8	2.4	2.4

B. Comparison and Analysis of Data

This section will compare the three transit oriented neighborhoods with three adjacent non-transit oriented neighborhoods, and three non-adjacent non-transit oriented, cul-de-sac neighborhoods. Each of the three neighborhoods will also be compared with the aspects of all neighborhoods in Montgomery County, Maryland. A brief description of each of the three types of neighborhoods will follow.

1. Overview of Neighborhood Types

a. Early Transit Oriented Neighborhoods

The previous section provided a more detailed summary of the characteristics of Garrett Park, Kensington, and Chevy Chase Village. The key aspects of these early transit oriented neighborhoods include the following:

1) modified grid system of streets - in addition to automobile access, provides maximum access for pedestrians and bike riders;

2) pedestrian access to transit - the circulation system for Garrett Park provides access to a commuter railroad terminal and "ride-on" bus to a nearby Metro station;

- the circulation system for Kensington creates access to a commuter railroad terminal and Metro bus transit along Connecticut Avenue;

- the circulation system for Chevy Chase Village establishes a ride-on bus system to a nearby Metro station and access to Metro bus along Connecticut Avenue;

3) setting or streetscape - each neighborhood has a pleasant setting that promotes pedestrian travel. Street trees, sidewalks separated from the street, and generous setbacks create human scale without conflicting with automobile traffic;

4) architecture - Garrett Park and Kensington are both on the National Register of Historic Places because of their victorian architecture. However, the emphasis in each neighborhood is placed on the districts rather than individual buildings.

b. Adjacent Non-Transit Oriented Neighborhoods

Adjacent neighborhoods with contrasting physical characteristics were used for comparison. Each adjacent neighborhood has the same school system, police force, county government system, and proximity to transit. These similarities isolate the design aspects of each neighborhood as major variables. A description of each adjacent non-transit oriented neighborhood with a corresponding transit oriented neighborhood follows.

1) Garrett Park versus Randolph Hills

A major portion of the residences in Randolph Hills are located as close to the existing railroad station as residences in Garrett Park. Although proximity to the railroad station is the same, the system of streets and sidewalks in Randolph Hills does not establish direct access to the adjacent railroad station. Access to Metro bus is also limited in comparison with Garrett Park because of the street and sidewalk system.

2) Kensington versus Rock Creek Palisades

The neighborhood of Rock Creek Palisades does not provide a mix of housing types, or commercial shops that are included in Kensington. The street system limits connection to Metro bus stops along Connecticut Avenue. The residences in Rock Creek Palisades were constructed during the 1950's instead of during the last 100 years as in Kensington.

3) Chevy Chase Village versus Sumner

These residential neighborhoods include some of the highest household incomes and most expensive housing in Montgomery County. The street system in Sumner can best be described as circuitous and pedestrian access to transit such as Metro bus is limited. Chevy Chase Village has a modified grid system of streets with sidewalks that provides direct access to the Metro bus stops along Connecticut Avenue.

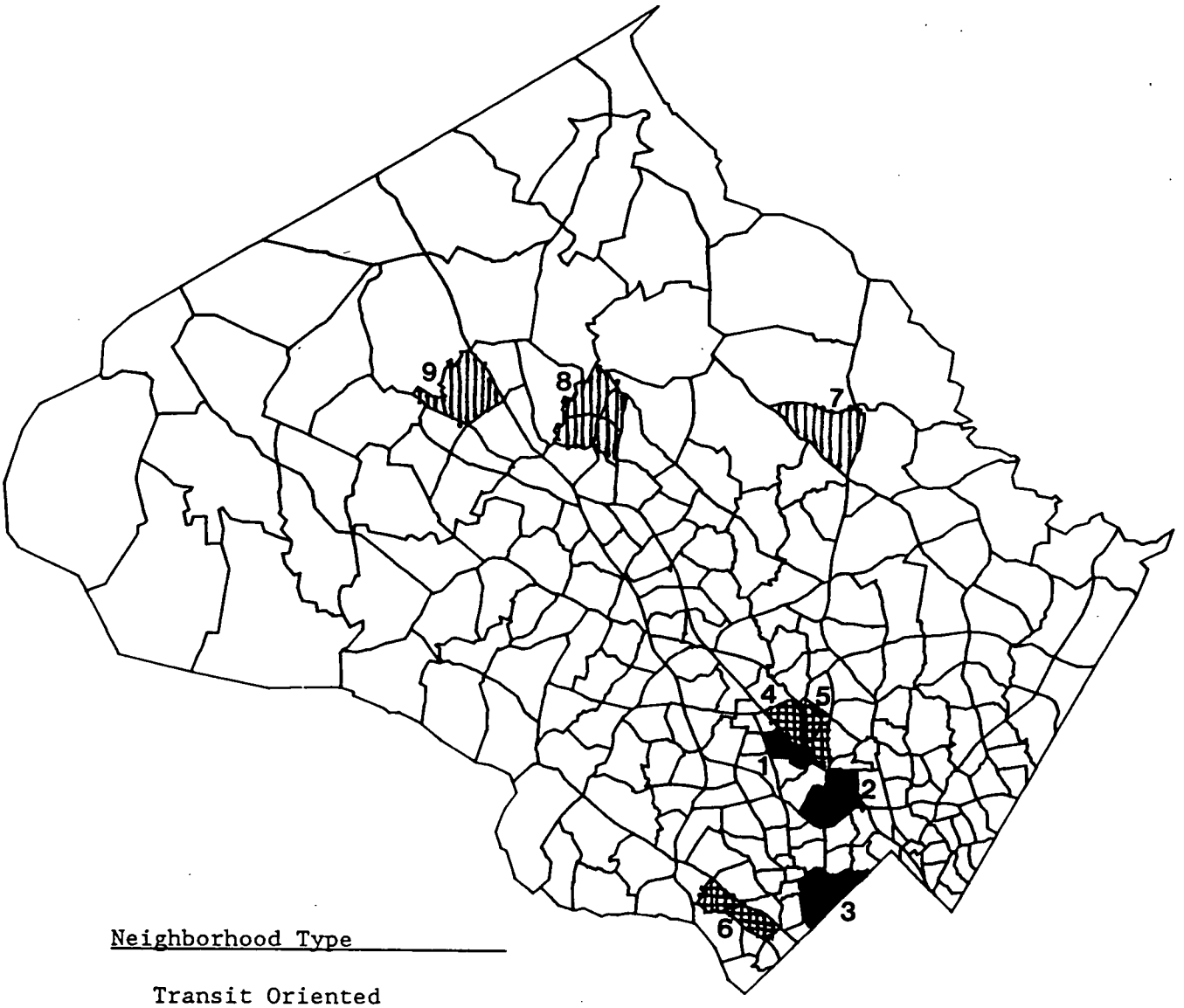
c. Non-Adjacent Cul-de-Sac Neighborhoods

The three non-adjacent cul-de-sac neighborhoods are located near the fringe areas of Montgomery County. These neighborhoods were all constructed in the 1960's and 1970's. In contrast with the early transit oriented neighborhoods, these developments include a cul-de-sac system of streets, primary dependence on the automobile, and the absence of street oriented pedestrian sidewalks. These neighborhoods are served by the Metro bus system in a limited manner.

2. Analysis of Data for Each Type of Neighborhood

The source of data includes the U.S. Census for 1960, 1970, and 1980. A census update survey conducted by the M-NCPPC was also used for 1987 data. This data provides an ability to analyze the trends within each neighborhood over a time period of 27 years. Because of the small size of the neighborhoods and the limited number of respondents, the 1987 data could be significantly impacted by a more complete sample of residences.

Montgomery County
Traffic zone Boundary Map



Neighborhood Type

Transit Oriented

1 Garrett Park
2 Kensington
3 Chevy Chase Village

Adjacent Non-Transit Oriented

4 Randolph Hills
5 Rock Creek Palisades
6 Sumner

Non-Adjacent Cul-de-Sac

7 Olney Manor
8 Montgomery Village
9 Germantown (Churchill)

a. Comparison of Transportation Characteristics

The transportation characteristics of each type of neighborhood are compared in the following chart. The data shows that residents of the early transit oriented neighborhoods are more likely to walk, bicycle, or use public transit to travel to work. As an example, the distance of residences to the railroad station is approximately the same in Garrett Park and Randolph Hills. The grid system of streets in Garrett Park allows direct access to the railroad station, but the system of streets in Randolph Hills does not provide direct access. As expected, the residents of Garrett Park use transit significantly more than residents of Randolph Hills despite equal distance of residences to the railroad station. The data in this table is consistent with the belief that an interconnected system of streets such as a grid system with sidewalks could be a strong indicator of transit use.

TABLE I:
COMPARISON OF TRANSPORTATION CHARACTERISTICS 1987

Neighborhood Type	Percent of Residents Using Public Transit	Percent of Residents Driving to Work
A. Transit Oriented		
1. Garrett Park	22	64
2. Kensington	14	73
3. Chevy Chase Village	26	72
B. Adjacent Non-Transit Oriented		
1. Randolph Hills	10	76
2. Rock Creek Palisades	8	86
3. Sumner	9	84
C. Non-Adjacent Cul-de-Sac		
1. Olney Manor	11	82
2. Montgomery Village	10	82
3. Germantown (Churchill)	8	83
D. Montgomery County	12	79

* Source: 1987 Census Update Survey, M-NCPPC

b. Mobility Characteristics

The mean length of stay in each residence and the percent of residents in their house over the last five years are compared in each neighborhood. Most of the neighborhoods in Montgomery County have a high degree of mobility. At least 50 percent of the residents moved over the last five years. Because of this high turnover in residents, neighborhoods are vulnerable and need assets to attract new residents who can maintain the attractiveness of the neighborhood. The physical attractiveness of a neighborhood including the setting and access to transit remain important features to allow a neighborhood to continue to attract appropriate residents and avoid decline. In general the residents of neighborhoods located in the fringe areas move more often than residents of older neighborhoods. However, this trend does not necessarily indicate that these newer areas are less attractive.

TABLE II:
COMPARISON OF MOBILITY CHARACTERISTICS

Item	Mean Length of Residence in Years	Percent of Residents in House Since 1982
A. Transit Oriented		
1. Garrett Park	14	-30
2. Kensington	12	30-50
3. Chevy Chase Village	17	-30
B. Adjacent Non-Transit Oriented		
1. Randolph Hills	9	-30
2. Rock Creek Palisades	18	-30
3. Sumner	13	-30
C. Non-Adjacent Cul-de-Sac		
1. Olney Manor	11	-30
2. Montgomery Village	6	30-50
3. Germantown	3	50
D. Montgomery County	10	50

* Source: 1987 Census Update Survey, M-NCPPC

c. Trends in Family Income

Changes in median family income from 1960 to 1987 are shown in the following table. The median family income was near the average median county income for all of the neighborhoods in 1960. The median income for the transit oriented neighborhoods was significantly above the median income for Montgomery County in 1987. Although the neighborhoods of Garrett Park and Kensington include a greater diversity of higher and lower incomes, the median income of these transit oriented neighborhoods increased at a more rapid rate than the non-transit oriented neighborhoods. This table indicates that the early transit oriented neighborhoods continue to be attractive in comparison with all of Montgomery County, and both the adjacent neighborhoods and all neighborhoods in Montgomery County.

TABLE III:
MEDIAN FAMILY INCOME ($)

	1960[1]	1970[1]	1980[1]	1987[2]	Percent Increase In Median Income From 1970-1987
A. Early Transit Oriented					
1. Garrett Park	7,798	17,274	34,693	70,000	405
2. Kensington	11,007	14,644	30,080	76,000	519
3. Chevy Chase Village	7,362	32,591	59,588	100,000+	307+
B. Adjacent Non-Transit Oriented					
1. Randolph Hills	7,798	14,697	30,714	47,000	320
2. Rock Creek Palisades	5,590	16,555	31,856	51,000	308
3. Sumner	8,261	25,505	51,444	85,000	313
C. Non-Adjacent Cul-de-Sac					
1. Olney Manor	N/A	16,607	35,989	65,000	391
2. Montgomery Village	N/A	19,348	33,731	51,000	263
3. Germantown	N/A	10,813	27,646	47,000	434
D. Montgomery County Total	9,317	16,710	28,987	46,745	279

* Source: [1] U.S. Census
[2] 1987 Census Update Survey, M-NCPPC

d. Trends in Price of Housing

The housing in both the transit and non-transit oriented increased in price at a more rapid rate than newer neighborhoods located in the developing fringe. The price of housing in transit oriented neighborhoods increased at approximately the same rate as the non-transit oriented neighborhood. This characteristic is true even though the neighborhoods of Garrett Park and Kensington include a wide variety in the price of individual houses. Again, these transit oriented neighborhoods have clearly remained attractive to existing and potential residents from 1960 to 1980.

TABLE IV:
MEDIAN VALUE OF OWNER OCCUPIED NON-CONDOS ($)

	1960	1970	1980	Percent Increase In Median Value From 1970 to 1987
A. Early Transit Oriented				
1. Garrett Park	24,907	29,700	96,300	324
2. Kensington	19,000	27,900	92,300	331
3. Chevy Chase Village	35,000+	50,000+	200,000	400
B. Adjacent Non-Transit Oriented				
1. Randolph Hills	18,000	26,300	73,500	279
2. Rock Creek Palisades	13,200	26,400	77,000	291
3. Sumner	35,000+	46,700	148,500	317
C. Non-Adjacent Cul-de-Sac				
1. Olney Manor	N/A	40,500	99,000	244
2. Montgomery Village	N/A	41,700	85,000	204
3. Germantown	N/A	35,200	69,000	196
D. Montgomery County Total	19,800	32,700	97,300	298

* Source: U.S. Census

e. Trends in Household Characteristics

The age of housing, age of head of household, and the household income for each different neighborhood are shown in the following table. The overall age of housing was approximately the same in the transit oriented and the adjacent non-transit oriented neighborhoods. The data also indicates that the residents were generally younger in the non-adjacent cul-de-sac neighborhoods located at the fringe of development in Montgomery County. As described earlier, the older neighborhoods in Montgomery County contain wealthier residents than the newer cul-de-sac neighborhoods. The data indicates again that the early transit oriented neighborhoods have remained attractive.

TABLE V:
COMPARISON OF MEDIAN HOUSEHOLD CHARACTERISTICS - 1987

	Housing Age (Years)	Householder Age (Years)	Household Income ($)
A. Early Transit Oriented			
1. Garrett Park	31	49	70,000
2. Kensington	35	48	75,000
3. Chevy Chase Village	57	50	90,000
B. Adjacent Non-Transit Oriented			
1. Randolph Hills	27	43	47,000
2. Rock Creek Palisades	30	50	51,000
3. Sumner	32	50	85,000
C. Non-Adjacent Cul-de-Sac			
1. Olney Manor	15	45	65,000
2. Montgomery Village	11	45	51,000
3. Germantown	5	37	47,000
D. Montgomery County Total	24	43	46,745

* Source: 1987 Census Update Survey, M-NCPPC

3. Summary of Findings

Any conclusions from this data should be carefully considered because of the limited size of the neighborhoods and the small sample size used in the 1987 Census Update. The data is consistent with an interpretation that the three early transit oriented neighborhoods have remained attractive places to live for existing and potential residents. Although these neighborhoods are approximately 100 years old, the trickle down process which provides for the outward movement of wealthier households from older, often deteriorated housing in expanding fringes of metropolitan areas has not occurred. In short, these three neighborhoods have remained desirable places to live. The data is consistent with an interpretation that the design of the neighborhoods can have a positive impact on use of transit and decreasing dependence on the automobile. The houses in the early transit oriented neighborhoods vary substantially in median age. The houses in the adjacent non-transit oriented neighborhoods were constructed within a relatively short period of time. This accounts for the similarity in median age of houses in both types of neighborhood.

V. STRATEGIES FOR THE FUTURE

A. Attributes of Successful Early Transit Oriented Neighborhoods

The early railroad suburbs generated confidence in individuals to locate in the suburban edges of cities. As discussed earlier, these suburbs created a sense of secure home owners hip opportunities and investments, and physical safety, in an attractive setting. Many of these early railroad and trolley suburbs have continued to attract and retain mobile and upper income residents. The urban design attributes of these neighborhoods which may have favorably influenced individual choices include the following:

1. proximity to rail transit;

2. modified grid system of streets with shade trees and sidewalks that connect all areas of the neighborhood for the pedestrian and the automobile;

3. distinctive and well-preserved architecture;

4. approximately 150-350 acres in size and accommodating over 1,000 persons within a 1/2 mile walk of the transit station.

B. Neighborhood Development Strategy for the Expanding Suburbs

Many suburban counties in the United States, such as Montgomery County, Maryland, are part of large metropolitan areas that are expected to continue to experience substantial growth into the next century. The strategies for neighborhood development that will maintain the strengths of existing neighborhoods such as the three transit oriented neighborhoods, and encouraging development of new neighborhoods that

will continue to be successful over time is of critical importance if these suburban counties are to continue to be attractive to existing and potential residents.

The inner suburbs of these counties are aging. The high price of land on the fringe will create even higher priced housing. These trends will encourage outward mobility or filtering, as part of the trickle down process described earlier in this paper increasing the potential for decline of the inner suburbs.

The growth management and transportation polices address development issues at one scale. The lessons learned from the analysis of early transit oriented neighborhoods fill a need to address development issues at the neighborhood scale.

C. Implementation Issues

As with any design direction, these ideas have their share of problems with implementation. Substantial regulatory obstacles will have to be overcome in many jurisdictions to implement these concepts. New and flexible zoning codes would have to be created to permit a range of housing types, a mix of uses, and provide important civic spaces such as parks within a compact area. These new zoning codes will need to be crafted in a manner that provides a sense of security to individuals that present codes have already attained.

The transportation planning process also will need to be modified. New road standards that require appropriate sidewalks, street trees, and minimum width of pavement to encourage a walkable environment will be required. Cul-de-sacs that preclude through-pedestrian and vehicular access to the transit station and other destinations will need to be eliminated. Present traffic analysis techniques that emphasize significant spacing between intersections and wider intersections to provide turn lanes and emphasize through-traffic should be modified to improve pedestrian crossing access and slow traffic within the neighborhoods. Encouraging on-street parking instead of off-street parking should be implemented to provide a separation of pedestrians from vehicles and also encourage a walkable environment.

These transit oriented neighborhoods would be best located in the growth corridors. The current development trends in Montgomery County indicate that over 120,000 people will be added to the existing population by the year 2010. A large majority of this population will be located in the existing development corridors near proposed transit lines or within the expansion system of the Metro bus system. Creating a strong policy for the creation of transit oriented neighborhoods could affect a major portion of future development in growing suburban areas such as Montgomery County, Maryland.

D. Summary

In summary, this paper has indicated that the early transit oriented neighborhoods have remained successful communities over a long period of time despite significant competition from adjacent jurisdictions. The data indicates that the design of streets and pedestrian orienta-

tion encourages the use of transit. The data also indicates that these older communities have continued to thrive and avoid decline in relationship to adjacent non-transit oriented neighborhoods and other neighborhoods in Montgomery County in general.

These transit oriented neighborhoods would continue to require confidence on the part of the private sector development process to be implemented. Providing special attention to the design of streets, placement of buildings, and a new commitment to design excellence would all need to be implemented by the private market to achieve the desired results.

The transit oriented neighborhood does not solve the larger issues involved in declining cities and thriving suburbs. The hope for this form of development, properly implemented, is that it will create attractive neighborhoods that will provide desirable places to live in the highly competitive atmosphere between jurisdictions within large metropolitan areas.

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PART II:
REPORTS OF THE CONSULTANTS

TRANSIT AND PEDESTRIAN ORIENTED NEIGHBORHOOD STUDY

March 1993

Compiled by: *The Maryland-National Capital Park and Planning Commission*

Reports by: *Sasaki Associates, Inc.*
Peter Breitling
JHK Associates
White Mountain Survey, Co., Inc.
ZHA Associates

NOTICE TO READERS

This document is Part II of the Transit and Pedestrian Oriented Neighborhood Study. It contains six reports prepared by the consultants selected to assist the M-NCPPC in the preparation of this neighborhood study. These reports were prepared by each of the consultants with the overview and assistance of the staff from M-NCPPC. Part I of the Transit and Pedestrian Oriented Neighborhood Study, which is found in another document, is a summary of the findings from these reports.

The introduction of this report describes the problem, purpose and scope of work for the Transit and Pedestrian Oriented Neighborhood Study. The six reports provide key information concerning specific tasks of the team of consultants. This report is not a documentation of all the efforts of the consultants.

Together, the introduction and the six reports provide insights into the methods for establishing a hallmark approach to neighborhood scale planning that will respond to the growth management needs of Montgomery County. Part II of the study begins to address the desire for strategic concentration, to identify transit, bicycle and pedestrian oriented neighborhood design principles, and to suggest some strategies for action.

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INTRODUCTION

PROBLEM STATEMENT

Montgomery County has an explicit growth management policy of concentrating development along transit corridors and away from agricultural and open space areas or wedges. With the adoption of the *General Plan on Wedges and Corridors* in 1964, the recent *General Plan Refinement*, and the preparation of a series of master plans over three decades, these growth management policies have been put into practice. A series of innovative regulatory tools, including zoning, subdivision, and site plan techniques, have also been developed to apply the principles identified in the General Plan and master plans.

Recent master plans and regulatory efforts continue to augment and reinforce the efforts to concentrate development into corridors and away from wedge areas. These recent master plans and regulatory efforts include as a major feature the concept of mixing commercial and residential land uses in compact, higher density transit and pedestrian oriented areas.

The central problem for this study is how to provide better transportation, including transit, bicycle, and pedestrian access in neighborhoods, and create more "complete" neighborhoods that offer increased opportunities for services, shopping, recreation, social interaction, employment, and a greater sense of belonging.

PURPOSES OF THIS STUDY

The recent master plans for Clarksburg, North Bethesda, Shady Grove, and the Germantown Town Center identify key urban design elements, policies, and guidelines to create successful transit and pedestrian oriented neighborhoods. As part of ongoing efforts to examine desirable changes to the Road Code for Montgomery County, additional standards have been discussed to improve pedestrian access to transit and community facilities and services within higher density transit and pedestrian oriented commercial districts and mixed use centers. Recent examples of regulatory planning have also discovered modifications to existing codes and standards that would foster the creation of more transit and pedestrian oriented neighborhoods.

The primary purposes of Part II of the Transit and Pedestrian Oriented Neighborhood Study include the following:

Analyze Innovative Plans

Create a graphic and written document of innovative plans and concepts that will augment and reinforce the policies of the General Plan for Montgomery County and implement the master planning and regulatory planning efforts.

Physical Characteristics

Identify the key physical characteristics of transit and pedestrian oriented neighborhoods.

Identify Implementation Strategies

A key purpose of this study is to propose specific modifications to the existing regulations that now serve as an impediment to the creation of transit and pedestrian oriented neighborhoods.

SCOPE OF WORK

For purposes of this study, a transit and pedestrian oriented neighborhood was specifically defined as the area within a ¼ mile of a transit facility or transportation node. Transit facilities include a Metro stop, "light rail" facility, bus stops, and other central locations of transportation service, such as commuter parking areas. A variety of neighborhoods with a range of densities, a mix of uses, and different development patterns were examined to correspond to the diversity in Montgomery County. Rural areas and central business districts were excluded from this study.

Five consultants were selected to assist the staff of the M-NCPPC in the work on Part II of the study, which includes a series of papers from the consultants that summarize their findings. These papers have been integrated among the five consultants with assistance from the staff of the M-NCPPC to establish a common orientation and viewpoint. The key tasks of the study and the products or reports from each consultant include the following:

Analysis - Neighborhood Prototypes Study

With the use of graphic, visual survey and statistical methods, the team of consultants examined several existing and proposed transit and pedestrian oriented neighborhoods in Montgomery County, the United States, and other countries. Data from the U.S. Census was used for statistical comparison of travel methods in these neighborhoods.

Identification of Neighborhood Principles

After analyzing the existing and proposed neighborhoods, a set of common transit and pedestrian oriented design elements were identified. These elements were then converted into a set of principles that can be used to guide master and neighborhood planning efforts.

Synthesis - Three Neighborhoods in Montgomery County

The third task was the application of the planning principles to specific opportunities in Montgomery County. Sample designs for each of three neighborhoods were provided.

Implementation

Implementation strategies were developed through the analysis of prototypes and the application of the principles to specific neighborhoods in Montgomery County. This study also incorporates implementation strategies applicable to recent master planning and regulatory efforts in Montgomery County that emphasize the development of transit and pedestrian oriented neighborhoods.

B. Reports of the Consultants

ANALYSIS OF PAST, PRESENT, AND FUTURE TRANSIT AND PEDESTRIAN ORIENTED NEIGHBORHOODS

Sasaki Associates, Inc.
Watertown, Massachusetts

INTRODUCTION

This paper identifies the characteristics that distinguish transit and pedestrian oriented neighborhoods from other patterns of development. To accomplish this goal, a case study approach was used. Over 150 neighborhoods were examined as possible case studies following an extensive review of available information and suggestions from staff of M-NCPPC and County Government. Eleven of these transit and pedestrian oriented neighborhoods were selected for study in detail. These neighborhoods include both older railroad oriented neighborhoods developed prior to use of the automobile and recently proposed neighborhoods with a development pattern established to specifically incorporate transit and improve access for pedestrians. Drawings were prepared at the same scale for each neighborhood to assist in comparing and identifying characteristics of transit and pedestrian oriented neighborhoods. Photographs and critical dimensions, such as width of streets and sidewalks, setbacks, and building heights, were obtained for a majority of the selected neighborhoods. The drawings, supplemented by visits to the sites, provide a unique catalog of information that was not previously available.

RANGE OF NEIGHBORHOOD TYPES

This report examines a variety of neighborhood sizes including:

a. low density neighborhoods along a bus line(s);

b. medium density neighborhoods located around retail areas with grocery stores and other services, and with extensive bus service; and

c. high density mixed use neighborhoods with a variety of employment, residential, and retail uses along rail lines.

This variety of neighborhood types was intended to apply to the area of Montgomery County located outside the central business districts and rural areas, but within the urban and suburban areas.

ASSUMPTIONS

As part of the selection process for the case studies, a series of assumptions were developed to limit the range of pursuit. For the purposes of this analysis, transit and pedestrian oriented neighborhoods were defined as containing the following components:

a. Transit Orientation - reliance on transit in the form of rail, trolley, or bus for major access to a nearby central business district;

b. Pedestrian Orientation - reliance on pedestrian travel as a major connection to transit and other neighborhood services, and a major limitation on geographic size (i.e., a major portion of the neighborhood within a ¼-mile radius of transit facilities);

c. Suburban Location - concerned with a variety of neighborhood types located outside central business districts and not within rural areas;

d. Specific Design Intent or Responsibility - although many of the neighborhoods were constructed over time, they were the design responsibility of an identifiable group or individual;

e. Short Term Implementation - concerned with neighborhood scale of development capable of implementation over a relatively short time period instead of large scale regional plans; and

f. Patterns of Land Use and Design - primarily concerned with patterns of land use and design that establish transit and pedestrian oriented neighborhoods and not social and governmental systems.

TRANSIT AND PEDESTRIAN ORIENTED NEIGHBORHOODS: SURVEY OF PAST, PRESENT, AND FUTURE MODELS

A review of the case studies for transit and pedestrian oriented neighborhoods suggests that several neighborhood models are applicable to the growth management strategy of Montgomery County. These models should only be used as a beginning point in the development of a strategy to create transit and pedestrian oriented neighborhoods in Montgomery County.

The following paragraphs summarize several existing neighborhood models for transit and pedestrian oriented neighborhoods applicable to Montgomery County.

Late 19th Century - Transit-Oriented Neighborhoods

The early railroad and trolley oriented neighborhoods represented the first attempt at development outside the central city.

Andrew Jackson Downing and Frederick Law Olmsted represent two leading neighborhood planners of this time period. Examples of early railroad and trolley neighborhoods include Back Bay in Boston, Massachusetts; Riverside, near Chicago, Illinois; and Roland Park in Baltimore, Maryland. These neighborhood examples were a major influence on development throughout the United States, including Garrett Park, Kensington, and Chevy Chase Village in Montgomery County, Maryland. The success of these early neighborhoods was dependent on pedestrian access to transit for connection to central cities with jobs and major services since they were developed prior to the invention of the automobile. The vision of these early neighborhood planners included:

a. Sense of Community - a desire to develop a sense of community lacking in the industrial city during this time period;

b. Development of a New Housing Prototype - the small private house (cottage houses, not a stripped down version of a manor house or farmhouse, both of which were economically tied to the land) and the bedroom community;

c. Regional Design Orientation - development of a neighborhood design strategy tied to the region with the use of elements such as traditional building materials, plant materials, climatic conditions, and market concerns instead of a set of universal ideals, such as catchment populations and a specific mix of uses applied to all neighborhoods; and

d. Natural Environment - preservation and enhancement of the natural environment.

The visionary aspects of these early transit and pedestrian oriented neighborhoods were part of a pragmatic approach to attracting early residents to the distant suburbs. Safe and attractive access to transit, reliance on strict development standards in the form of restrictive covenants for design control, concern over maintaining and enhancing the natural environment, a transit station or public space located at the heart of the

community, and the creation of a distinctive pattern of streets, were all elements used to help create secure and attractive neighborhoods. The size of these early neighborhoods was based on walking distance to transit. These neighborhoods range in density from lower density neighborhoods, such as Roland Park, to the higher density neighborhoods, such as Back Bay. These neighborhoods were primarily residential in character with limited job opportunities.

Early 20th Century - Neighborhood Unit and Catchment Theory/Strategic Concentration vs. Sprawl

With the increase in population growth, prosperity, and mobility during the early 20th century, the concept of the larger self-contained community with several neighborhoods was developed. Ebenezer Howard, in Garden Cities of Tomorrow, elaborated on a model of city design based on satellite city concepts separated by greenbelts and connected to central cities by inter-municipal railways. Other key element of this planning model include the curving local street, naturalistic landscape design, and the separation of streets and pedestrian pathways. The plan for Radburn, New Jersey, by Clarence Stein; Greenbelt, Maryland; and more recently Columbia, Maryland and Reston, Virginia all borrow from this early 20th century planning model of a satellite city surrounded by a greenbelt. The plans of Hampstead Garden Suburb in England and Forest Hills in New York included in this study are examples of the application of the early 20th century planning model at the neighborhood scale. Forest Hills (designed by Grosvenor Atterbury with Olmsted and Olmsted) was a logical extension of the early railroad and trolley suburb and most likely an extension of the Olmsted vision of neighborhood that he established in Riverside. Forest Hills included the transit station, with small shops, apartments, and open space, as the center of the neighborhood, with schools, churches, and a club for recreation. A broad variety of housing types were included in this planning model, which expanded the concept of neighborhood from the early 19th century ideal. These neighborhoods, especially Forest Hills, influenced Clarence Perry in his formulation of the concept of neighborhood as "the number of houses that represent the catchment area for an elementary school with a shopping district in the periphery."

In contrast to the mathematical catchment area described by Clarence Perry, the British planner Richard Llewelyn-Davies rejected the notion of a single model for the neighborhood related to the catchment area of an elementary school or retail shopping area. He recognized that although neighborhoods are a basic building block of communities, they could have a variety of organizing components and densities.

The 1964 Wedges and Corridors Plan adopted by Montgomery County also rejected the pattern of self-contained satellite communities separated by rural open space. It recommended a corridor pattern that concentrates development along transportation routes without trying to retain large open spaces between self-contained population centers. A rich mix of neighborhoods with a variety of components has since been established within the I-270 corridor. The examples of neighborhood scale planning as a building block of a larger community, such as Forest Hills and Hampstead Garden Suburb, are instructive models for creating a rich variety of transit and pedestrian oriented neighborhoods.

Current Neighborhood Models and Planning Theory

Current neighborhood planning models include the urban quarter, pedestrian pocket, and neo-traditional development. These models all attempt to increase pedestrian orientation and integrate transit through land use and traditional design pattern.

a. Urban Quarter - The concept of an urban quarter, as described by Leon Krier in Houses, Places, and Cities, relies on walking distance as the key determinant of civic form. The urban quarter integrates residences, work places, and leisure activities, all within walking distance to form districts or neighborhoods of limited territorial size. This model uses the familiar forms of the closed urban block, defined street space, piazza, and landmark or monument found in older European cities as the essential components of the district or urban quarter.

   The partially constructed Carlyle neighborhood by Cooper and Robertson in Alexandria, Virginia, included in this study, incorporates many of the principles of the urban quarter. High density residences, offices, civic buildings, and parks are proposed within a compact district located at the King Street Metro station in Alexandria, Virginia. Revising current regulatory strategies was needed in Alexandria to implement the Carlyle neighborhood concept.

b. Pedestrian Pocket - Peter Calthorpe, in the Pedestrian Pocket Book: A New Suburban Design Strategy, describes the pedestrian pocket as a simple cluster of housing, including affordable dwelling units, retail spaces, and offices within a ¼-mile walking radius of a transit station. With this mix of uses, the pedestrian pocket provides a choice of walking, driving, carpooling, or riding mass transit. As a new suburban design strategy, the pedestrian pocket was established as part of efforts to channel higher density development around light rail stations. This strategy could also be used around bus transit facilities. In contrast to the more dogmatic theories of Leon Krier, the pedestrian pocket was conceived as one alternative to auto dominated development rather than a mandate for change. The Laguna Creek development by Peter Calthorpe, located near Sacramento, is a recent application of the pedestrian pocket concept included in this study.

c. Neo-Traditional Development - Andres Duany and Elizabeth Plater-Zyberk have developed the concept of the neo-traditional town. For more than a decade, this team has been attempting to reinvent the suburb. Their solution emphasizes increasing pedestrian orientation by establishing plans for towns and neighborhoods according to "old-fashioned" fundamental principles. This model attempts to borrow from the successful elements of traditional neighborhoods like Princeton, New Jersey; Oak Park, Illinois; and Annapolis, Maryland. The premise is that America's 18th and 19th century towns remain models for creating new suburbs that have been neglected for over half a century. They see the present auto dominated suburb as a catastrophic mistake measured in traffic congestion, air pollution, vast sums of money spent on oversized roads and infrastructure, and fragmentation of civic life. This model includes the following building blocks for any neighborhood:

- town centers - create a commercial downtown no more than a five-minute walk from any point within a neighborhood
- huddled houses - situate houses close together to foster a tighter sense of community
- streets for feet - build narrow streets in clear patterns that encourage pedestrians
- local vernacular - establish a consistent scale and an appropriate architectural style
- civic landmarks - design congenial parks and use public buildings as focal points.

Over 30 towns and neighborhoods have been designed with this model, including Kentlands in Gaithersburg, Maryland. With the exception of Avalon Park, Florida, which is one of the case studies analyzed in this study, few of these towns and neighborhoods have been designed with transit as an organizing principle.

Duany and Plater-Zyberk are also highly critical of existing ordinances and regulations that prohibit the construction of the mixed use neighborhood based on traditional town planning principles. They are also critical of existing road codes and standards that establish wide streets and provide for high speed travel for automobiles while discouraging pedestrian travel. As a revision to existing codes and standards, the traditional neighborhood development (TND) ordinance is a key feature of each neighborhood design.

In summary, the urban quarter, pedestrian pocket, and neo-traditional neighborhood share the following principles:

- emphasize the five-minute walk or ¼-mile radius as the basic determinate of the size of a neighborhood (in contrast with a mathematical determinate or catchment model of Clarence Perry that restricts the size of neighborhood to the population capable of supporting an elementary school)
- emphasize the neighborhood as a basic building block of planning
- emphasize a wide range of neighborhood types from lower density to high density neighborhoods that provide a range of residential options and employment opportunities
- emphasize the need to revise existing codes and standards to facilitate the creation of transit and pedestrian oriented neighborhoods.

CASE STUDIES

The intent of this section of the study is to analyze 11 specific transit and pedestrian oriented neighborhoods and identify common development characteristics that distinguish these neighborhoods from other patterns of development. This analysis provides a description of each case study and a summary of the key patterns. The following chart identifies the case studies.

Table 1

CASE STUDIES

Case Studies
Transit and Pedestrian Oriented Neighborhoods
Past, Present, and Future

EXAMPLES	TYPE I	TYPE II	TYPE III
Historic Prototypes	Back Bay (Boston, MA)	Hampstead Garden (London, England)	Riverside (Chicago, Ill.)
		Forest Hills (N.Y.C.)	Roland Park (Baltimore, MD)
Local Examples (Montgomery County)		Kensington	Chevy Chase Garrett Park
Contemporary Designs	Carlyle (Alexandria, VA)	Laguna Creek Ranch (Sacremento, CA)	Avalon Park, (Orlando, FL)

Notes:
- TYPE I - High density, mixed use neighborhoods located along rail lines.
- TYPE II - Medium density with a retail center, but predominately residential neighborhoods located along rail or bus lines.
- TYPE III - Low density, predominately residential neighborhood located along rail or bus lines.

Historic Prototypes

The case study of historic prototypes compares five existing transit and pedestrian oriented neighborhoods. A range of densities was selected for analysis to apply to the range of existing and proposed neighborhoods in Montgomery County.

Each of these existing neighborhoods relies on transit in the form of rail, trolley, or bus to provide access to a nearby central business district. They range from high density neighborhoods such as Back Bay to low density neighborhoods such as Roland Park. Many of these neighborhoods were designed prior to the invention of the automobile, and providing access for pedestrians was a key feature. Finally, all of these neighborhoods were the design responsibility of a specific individual or group.

The five historic neighborhood prototypes include the following:

Back Bay . . . . . Boston, Massachusetts

Forest Hills Gardens . . . . . New York, New York

Hampstead Garden Suburb . . . . . London, England

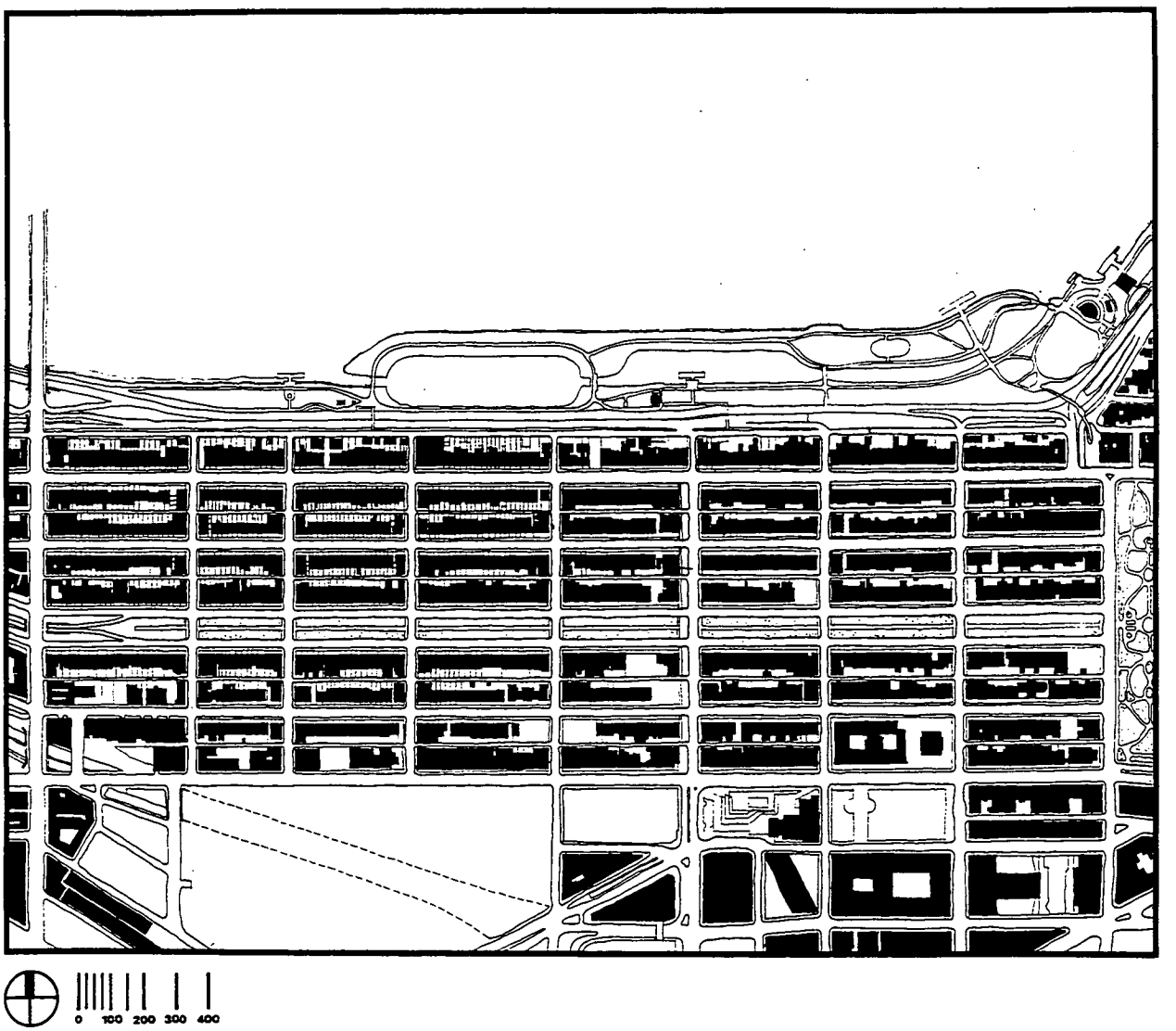
Riverside . . . . . Chicago, Illinois

Roland Park . . . . . Baltimore, Maryland

BACK BAY Boston, Massachusetts

Developer: Tripartite Indenture
(Commonwealth of Massachusetts,
City of Boston and Private Developer)

Architect/Planners: Arthur Gilman with George Snell,
Copeland and Alexander, 1856.



Back Bay is a late 19th century example of a high density, mixed use neighborhood located along a rail transit line. This development has remained a highly desirable transit and pedestrian oriented neighborhood for over 125 years. Because of major drainage problems, the Board of Health in 1849 described the condition of this portion of Boston as "one of nuisance, offensive and injurious to the large and increasing population." As a result of the health problems and the need to accommodate the population expansion of Boston, the plan for the Back Bay was adopted in 1856. The original developers of Back Bay intended to create an attractive and stable neighborhood from the swamps of Boston. The city carefully orchestrated the location of major institutions, the construction of attractive public streets, the provision of centrally located parks, and the creation of a variety of transit options.

Summary of Patterns

a. Transit Orientation - The Back Bay was established with "horse car" service, which was soon upgraded to electric trolley service.

b. Street and Pedestrian Pattern - The rational, speculative, grid layout provides for western expansion of the city from the Boston Public Garden. The plan provided four new parallel streets that are intersected at intervals varying from 550 to 600 feet, by cross streets. Alleys provide access to the central areas of each block. The major street (Commonwealth Avenue) is 200 feet wide with a park or median between the roadways. Sidewalks are provided along all streets.

c. Open Space Structure - Commonwealth Avenue provides a major green, axial spine that ties the Boston Public Garden and the Fens through Back Bay. Since 1931, Storrow Park provides a green area along the Charles River.

d. Land Use Pattern - Retail, office, and civic uses occur primarily along Boylston Street. Newberry Street has become a specialty retail center.

High density attached townhouses and apartment buildings are evenly distributed throughout the Back Bay neighborhood. Higher density housing occurs at street corners and along Commonwealth Avenue. The constant block size, setbacks from streets, and building height restrictions provide a highly recognizable, urban pattern of development.

Relationship to Context

Back Bay functions as a distinct neighborhood with perceived edges and a well defined system of streets, open spaces, and attached housing. Back Bay is linked by streets, to the old city of Boston to the east and the Kenmore Square neighborhood to the west.

Implication for Montgomery County

a. Scale of Development - The high density, low rise characteristics of Back Bay provide a potential model for the development of high density mixed use areas located along transit lines in Montgomery County such as Grosvenor, White Flint, Twinbrook, and the Shady Grove Metro station areas.

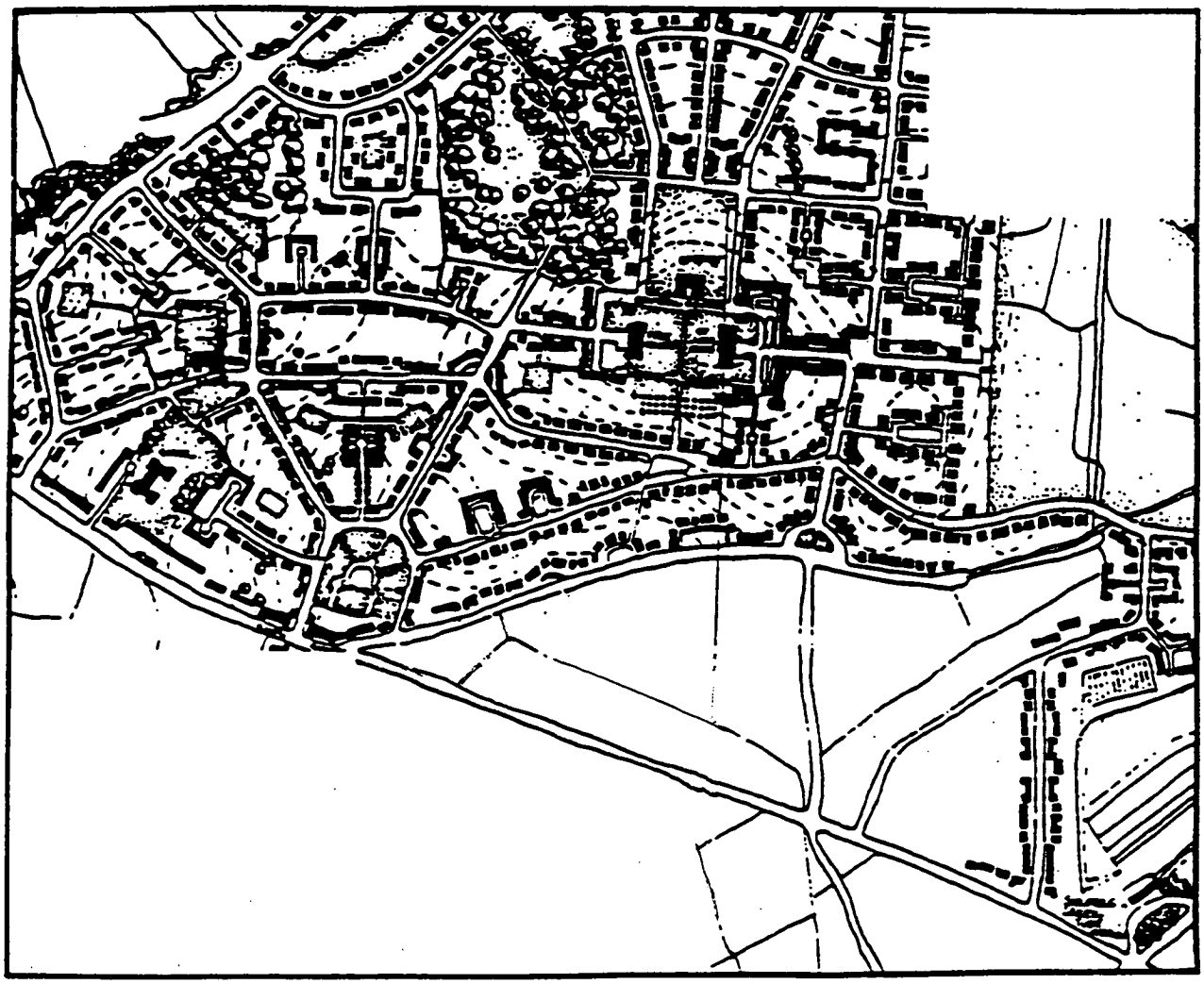
b. Interconnected Streets - The organization of grid streets and blocks provides access to transit.

c. Quality Pedestrian Environment - The linear park along Commonwealth Avenue, streetscape, and building setbacks establish a pedestrian oriented scale of development within a high density area.

HAMPSTEAD GARDEN SUBURB London, England

Developer: Henrietta Barnett

Architect/Planner: Parker and Unwin, 1906.



Hampstead Garden Suburb has become one of the prototypes of modern English Town Planning. This garden suburb began as an effort to preserve a portion of the disappearing landscape around London when the London transit system extended to the western boundary of the site. It is an example of a medium density neighborhood. The principles of development began from the ideals of Ebenezer Howard and the garden city movement as an attempt to integrate the neighborhood with the natural environment. The basic economic goal of this new suburb was to establish a high quality, primarily residential community within a reasonable commuting distance of London. As a societal goal, the developer was primarily interested in reform of the suburb by reintegrating all social classes within it.

Summary of Patterns

a. Transit as a Generator of Form - Transit was a key generator of form. The location and layout was a direct outcome of the location of an underground rail stop linking Hampstead Garden Suburb with London. A majority of the development is within a 20-minute walk of the transit station.

b. Street and Pedestrian Pattern - The street pattern consists of three radial patterns that focus on the commercial and institutional aspects of the suburb. Through streets are located on the boundary of the suburb. The street pattern uses landmarks such as the Lutyens Church to terminate key vistas. The pedestrian system is located primarily along streets and provides linkage to the transit stop, parks, retail, and civic centers.

c. Open Space Structure - Each main section of this garden suburb includes a major open space. Within these sections, smaller mid-block play areas are also provided. The southern portion of this suburb is bounded by a large regional open space system (Hampstead Heath). Two streets link Hampstead Heath with the two major open spaces (Big Wood and Central Square).

d. Land Use Pattern - Retail uses and a variety of housing types are found in this garden suburb. The retail center is located at the entrance to the development along Finchley Road.

e. "Quadrangle" Housing - Higher densities of courtyard and apartment housing are located around the retail and civic centers, and Hampstead Garden Suburb includes a unique "quadrangle" housing type that integrates higher density housing around a semi-public open space.

Relationship to Context

This suburb was intended to be a self-sufficient residential community. The Hampstead Heath separates this development from surrounding areas. Through traffic is eliminated.

Implications for Montgomery County

a. Housing and Open Space - The use of the "quadrangle" housing type, although discouraged by the Subdivision Regulations, provides a method of combining higher density housing and open space worthy of emulating in Montgomery County.

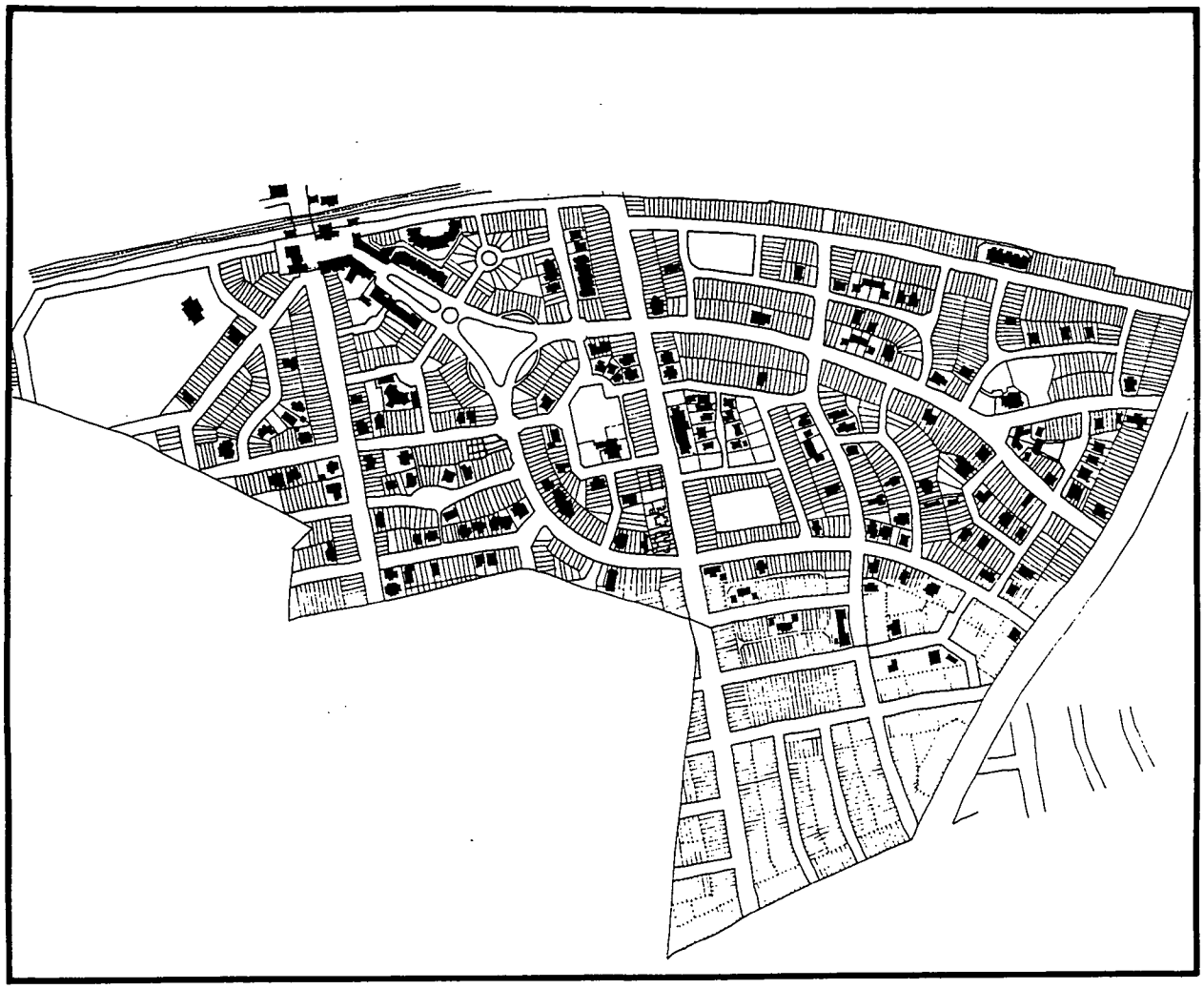
b. Building Setbacks - The minimal building setback from streets provides a pedestrian oriented form of development.

c. Density - The 8-10 units per acre establish a medium density model of development with adequate amounts of open space.

FOREST HILLS GARDENS New York, New York

Developer: Russell Sage Foundation

Architect/Planner: Grosvenor Atterbury with the Olmsted Brothers, 1912.



Forest Hills is an example of an early 20th century, medium density, primarily residential neighborhood located in Queens, New York. It is located 15 minutes by rail from Manhattan. Forest Hills Gardens follows the garden city example established by Parker and Unwin in the Hampstead Garden Suburb. It is a sequentially organized neighborhood based on a continuous line of movement from the railroad station to Forest Park - a metaphoric journey from town to open country. The Russell Sage Foundation, as developer, intended to demonstrate the greater profits to be realized from a new arrangement of streets, structures, and open spaces tied to the country, but within commuting distance of the employment center of New York. Three important principles of neighborhood scale planning form the basis for the overall scheme of development. The first principle was that main thoroughfares should be direct, ample, and convenient. Second, all other roads must be quiet, attractive residential streets - not fantastically crooked, but designed to discourage their use as thoroughfares. The final principle was that the entire neighborhood should be organized around smaller units with quiet streets and small-scale public open spaces.

Summary of Patterns

a. Transit as a Generator of Form - The location and layout of Forest Hills is a direct outcome of the commuter rail system to New York. The combined train station and subway stop establish the main center.

b. Street and Pedestrian Pattern - A distinct hierarchy of streets was developed, including a major arterial loop road and two arterial cross streets that link to the adjacent urban grid system. The loop road provides the primary access to the more quiet residential streets. The geometry of the street layout becomes more irregular as distance from the transit station increases. The loop road acts as a green corridor and provides major pedestrian access to transit.

c. Open Space Structure - The main civic open space, is carefully defined by buildings, is located at the transit station. Smaller open spaces are located throughout this suburb. An elementary school and tennis club are also located within the boundaries of this garden suburb. A progression from the urban open space at the transit station to a large open space area on the edge of the neighborhood occurs.

d. Land Use Pattern - Retail, hotel, civic/institutional, and residential uses are located within the neighborhood. The highest densities are located around the transit station. A unique system of attached housing grouped around a common open space feature was provided. A system of restrictive covenants was developed to carefully control development within the neighborhood. Because of the lack of garages and minimum on-street parking, major circulation and parking problems occur.

Relation to Context

The distinct loop system, irregular blocks, uniform landscaping, housing types, architectural character, and station square separate Forest Hills from the surrounding areas of Queens. The railroad line provides another barrier to the adjacent neighborhoods.

Implications for Montgomery County

a. Land Use and Density - This medium density, mixed use neighborhood could be used as a model for neighborhoods in Montgomery County that include a retail center surrounded by attached housing with clearly defined transit access, including bus or rail.

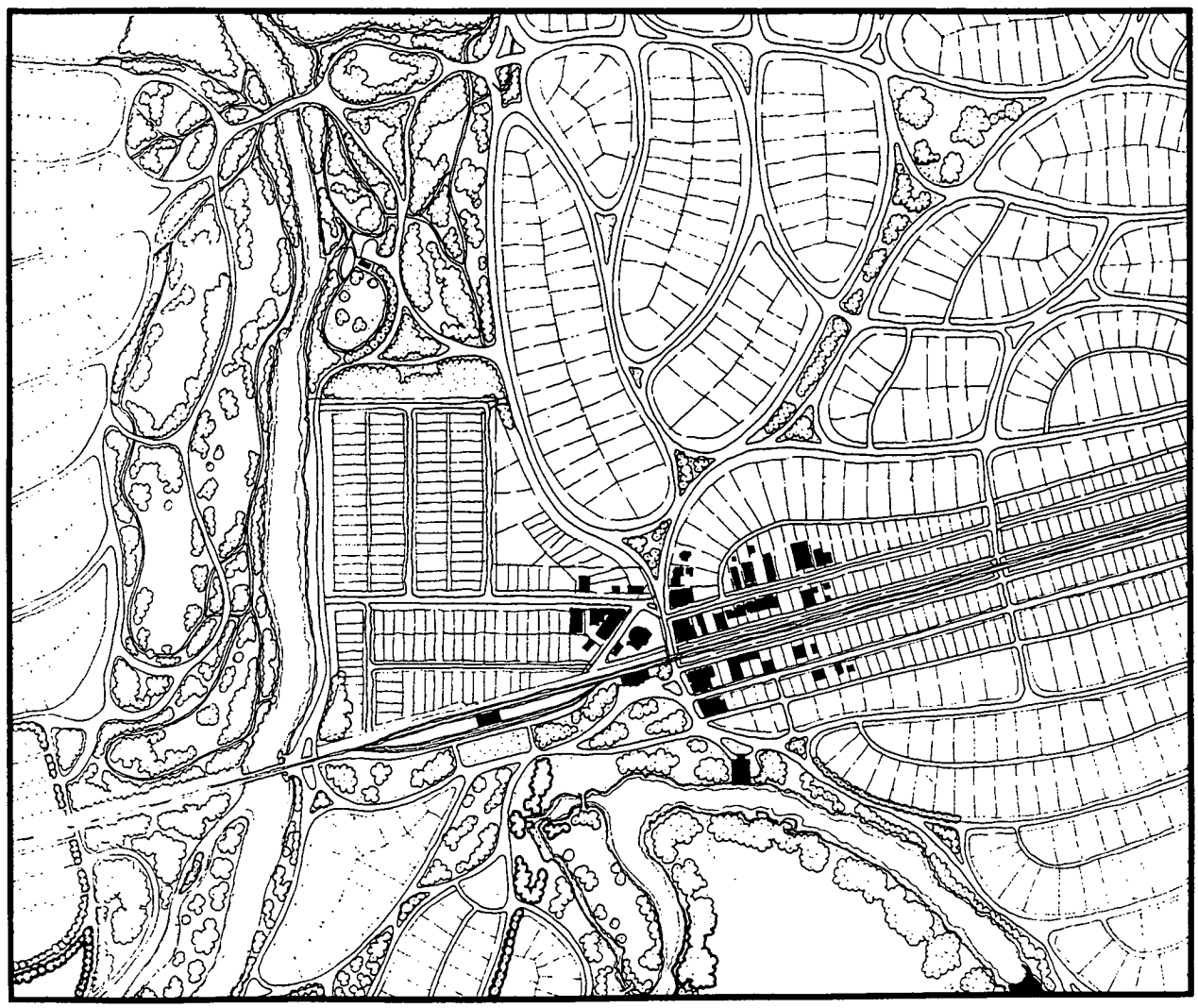
b. Street Character - The character of streets produced by careful attention to tree planting, setback of buildings, and on-street parking signifies a careful attention to the pedestrian and improves the connection to transit.

c. Open Spaces - The sequences and variety of open spaces are necessary elements of this garden suburb.

RIVERSIDE Chicago, Illinois

Developer: E. E. Childs and the Riverside Improvement Company

Architect/Planner: Olmsted, Vaux & Co., 1868.



The Riverside community is an example of a low density, primarily residential neighborhood oriented to transit. The complex system of curvilinear streets was a major departure from the rigid grid pattern of streets found in Chicago at the time. It was one of the earliest attempts to attract residents to the suburbs on a large scale. The 1,600-acre site is located on the Des Plaines River, nine miles west of the employment center of Chicago. In addition to the distinctive residential areas, Riverside has a town center with a railroad station, hotel, commercial and institutional buildings, high density residences, and a water tower that became a symbol of the community.

Summary of Patterns

a. Transit as a Generator of Form - The train station is the center and focus of Riverside.

b. Street and Pedestrian Pattern - All streets lead to the train station in a curvilinear pattern. A parkway along the railroad tracks was envisioned to connect Riverside to Chicago. Since Riverside was planned prior to the invention of the automobile, a sidewalk network as part of the street system is a key feature of the plan. Streets border all open spaces, which increases public access and visibility into the open spaces. The irregular and picturesque pattern of streets is the most distinguishing characteristic of this neighborhood. The careful attention to streetscaping, including trees and sidewalks, is a key feature that establishes an identifiable character for Riverside.

c. Open Space Structure - Open space is directly accessible from the streets as a series of smaller parks and linear green space. A large park area along the Des Plaines River with circular pathways and active recreation provides the major open space for Riverside. Four linear parks link the portion of Riverside to the town center. A civic space is located in the town center adjacent to the transit station.

d. Land Use Pattern - Single-family residential uses predominate. A cluster of office, retail, and higher density residential uses oriented to the transit station form a town center. Higher density housing is also located parallel to the railroad line in a grid pattern. The remaining portions of the neighborhood have irregularly shaped blocks with a large variety of lot sizes.

Relationship with Context

The curvilinear system of streets, irregular pattern of blocks, and the careful attention to streetscaping are the major characteristics that distinguished Riverside from the surrounding areas that were developed in a rigid grid pattern.

Implication for Montgomery County

a. Principles for Low Density Areas - Riverside provides a method of incorporating transit and pedestrian oriented design principles, even in low density areas.

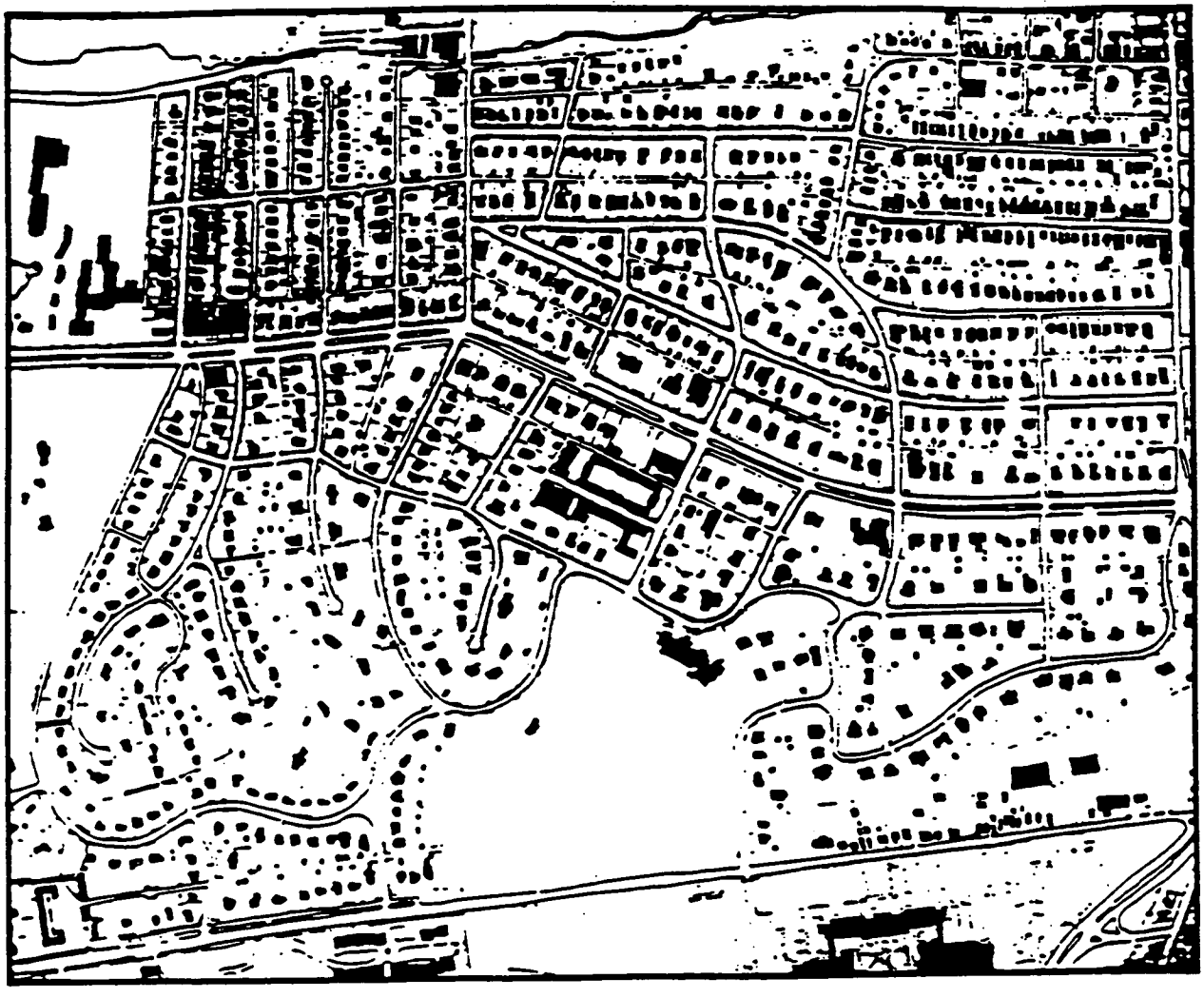
b. Environmental Constraints - The environmental constraints, such as preservation of the Des Plaines River, do not necessarily conflict with the need to cluster uses near transit.

c. Interconnected Streets - The curvilinear pattern of streets found in Riverside can also provide an interconnected system of streets that optimize the link to transit.

ROLAND PARK Baltimore, Maryland

Developer: Roland Park Development Company and Edward H. Bauton

Architect/Planner: George E. Kessler with Olmsted and Olmsted, 1891.



Roland Park is a local example of an early transit and pedestrian oriented neighborhood. It was planned as a low density residential suburb. It remains a desirable residential area located outside the central business district of Baltimore. The attention to the environmental constraints, the design of the neighborhood center, and the layout of several housing types have been widely studied and emulated in more recent neighborhood plans.

Summary of Patterns

a. Transit Orientation - An electric streetcar connected Roland Park to the central business district of Baltimore. The major streetcar stop was located along Roland Avenue at the retail center.

b. Street and Pedestrian Pattern - The interconnected system of streets provides direct connection to the transit. Regional through traffic is located at the edges of the neighborhood. The layout of streets was also carefully designed to reduce grading on steep slopes and preserve views.

c. Open space structure - The major open space feature, which includes several large trees and the Baltimore Country Club, is located along the western boundary of this neighborhood. Roland Avenue includes a large median and the adjacent houses have large setbacks to create the character of a parkway.

d. Land Use Pattern - The major center for the neighborhood includes a small retail area, mid- and low-rise residential buildings, and a church. Single-family detached units predominate in the remainder of Roland Park. Several unique examples of small clusters of houses are located in this neighborhood.

Relationship to Context

Major regional through traffic is located along the edges of this neighborhood. A major street connects Roland Park with the adjacent neighborhoods of Homewood and Guildford.

Implication for Montgomery County

a. Integration of Natural Constraints - Topographical and other natural constraints can be integrated into this transit and pedestrian oriented neighborhood.

b. Street Function - Roland Avenue carries transit vehicles and high traffic volumes without compromising the need for a pedestrian oriented boulevard that serves as the focus of this neighborhood.

Local Examples

This portion of the case study identifies three examples of transit and pedestrian oriented neighborhoods located in Montgomery County. The five historic prototypes discussed earlier, and other similar neighborhoods, were well known examples that greatly influenced neighborhood planning throughout the United States. Montgomery County has several neighborhoods that were influenced by these historic prototypes. Neighborhoods located along the B&O Railroad—such as Takoma Park, Silver Spring, Woodside, Forest Glen, Capitol View, Kensington, Garrett Park, Rockville, and Washington Grove—are all examples of earlier railroad oriented neighborhoods in Montgomery County. Chevy Chase Village is an example of a trolley oriented neighborhood in Montgomery County. This study examines in some detail the following neighborhoods arranged in order of density:

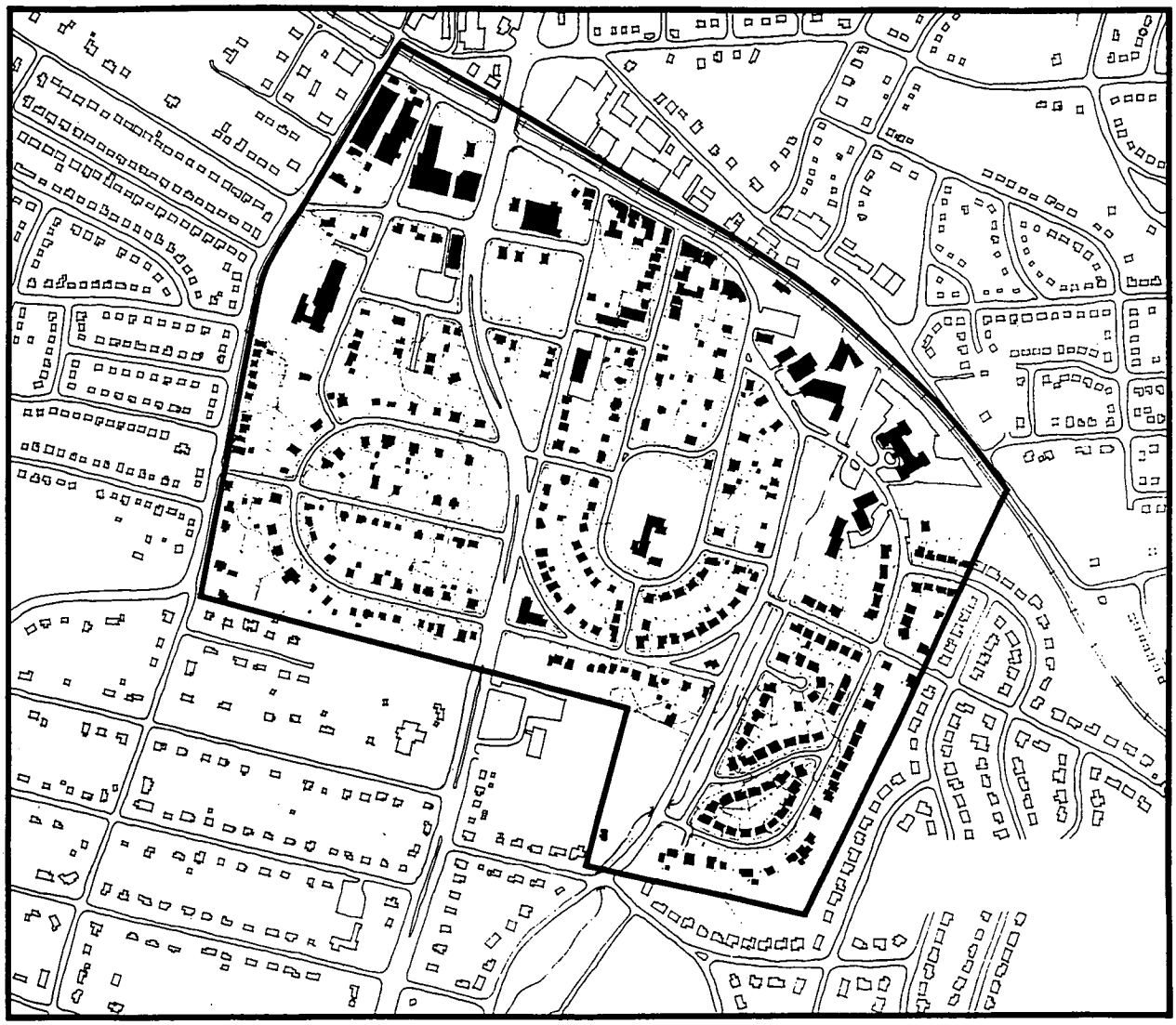
Kensington . . . . . Montgomery County, Maryland

Garrett Park . . . . . Montgomery County, Maryland

Chevy Chase Village . . . . . Montgomery County, Maryland

KENSINGTON Montgomery County, Maryland

Developer: Brainard H. Warner, 1890.



In the early 1890's, a real estate promoter, Brainard H. Warner, developed a railroad oriented neighborhood with streets and lots, a church, post office, and other services. This neighborhood was named Kensington, from a suburb of London, England. Today, Kensington is an example of a medium density mixed use neighborhood.

Summary of Patterns

a. Transit Orientation - The existing train station serves as a focus to the neighborhood.

b. Street and Pedestrian Pattern - The street pattern has a clear, geometric system that leads directly to the train station and retail area. Sidewalks are included along all streets.

c. Open Space Structure - Fields for active recreation and a school are located at the western edge of the neighborhood. An estate mansion acts as a symbolic focus and a major open space in the center of the residential areas.

d. Land Use Pattern - Retail, institutional, and higher density housing are clustered adjacent to the train station. Lower density, single-family detached houses predominate in the remainder of the neighborhood.

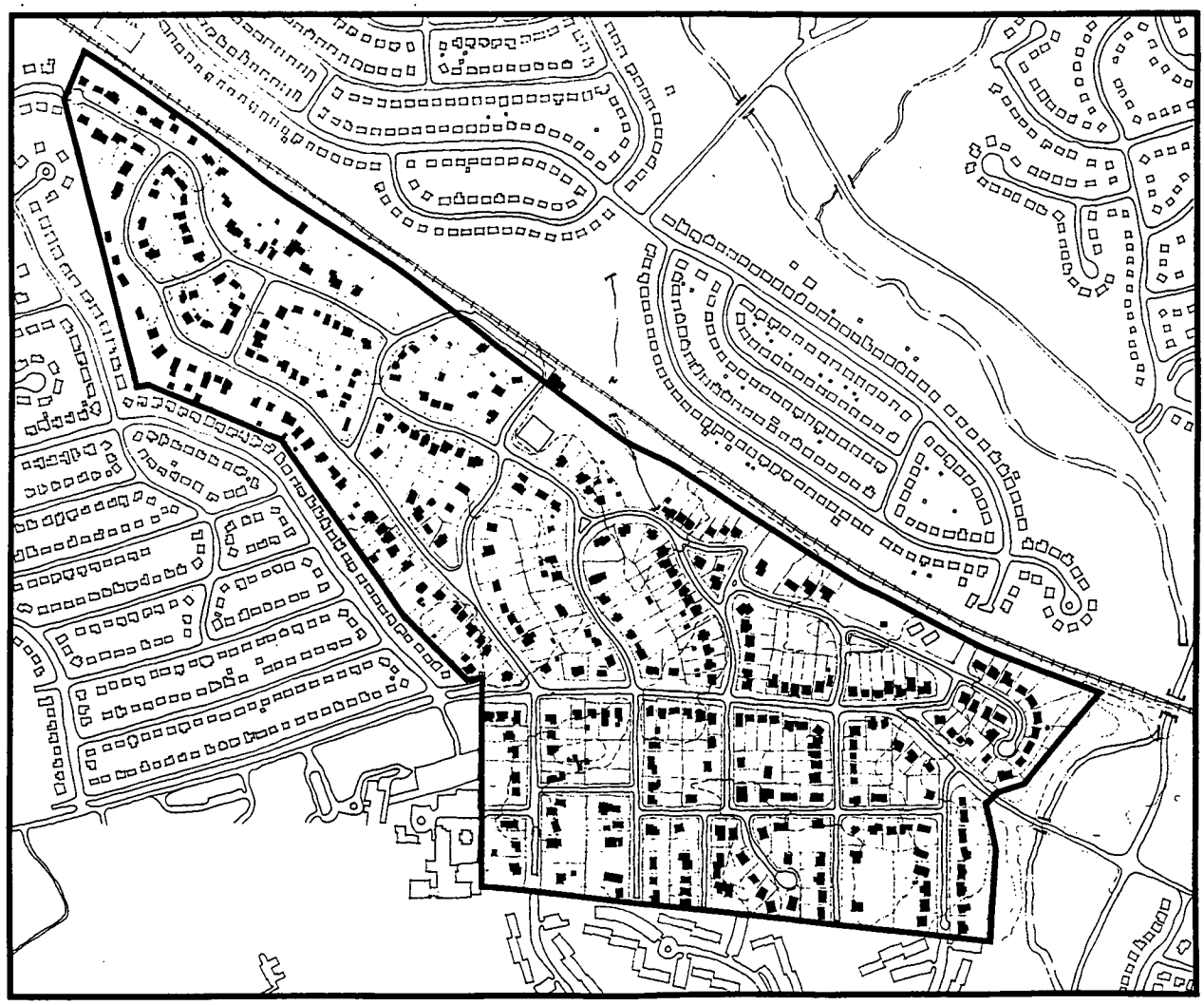
Relationship to Context

Connecticut Avenue, a major through traffic highway, bisects the original neighborhood. Residential neighborhoods, constructed more recently, surround Kensington.

GARRETT PARK Montgomery County, Maryland

Developer: Metropolitan Investment and Building Company

Architect/Planner: William Saunders and John T. Freeman, 1886.



The transit and pedestrian oriented neighborhood of Garrett Park was the next stop after Kensington on the B&O Railroad. The landscape architect responsible for this neighborhood plan was acquainted with the Olmsted plan of Riverside described earlier. As in Kensington, this neighborhood attracted wealthy residents from the existing inner-city neighborhoods that were in search of secure home ownership opportunities in the suburbs.

Summary of Patterns

a. Transit Orientation - The train station is the focus of this neighborhood.

b. Street and Pedestrian Pattern - Streets branch out from the train station. The pattern of streets form an interconnected curvilinear system.

c. Land Uses - A wide variety of single-family homes, including large, older homes and more recent smaller homes, are the predominate uses in this neighborhood. A Post Office and small store are located adjacent to the train station.

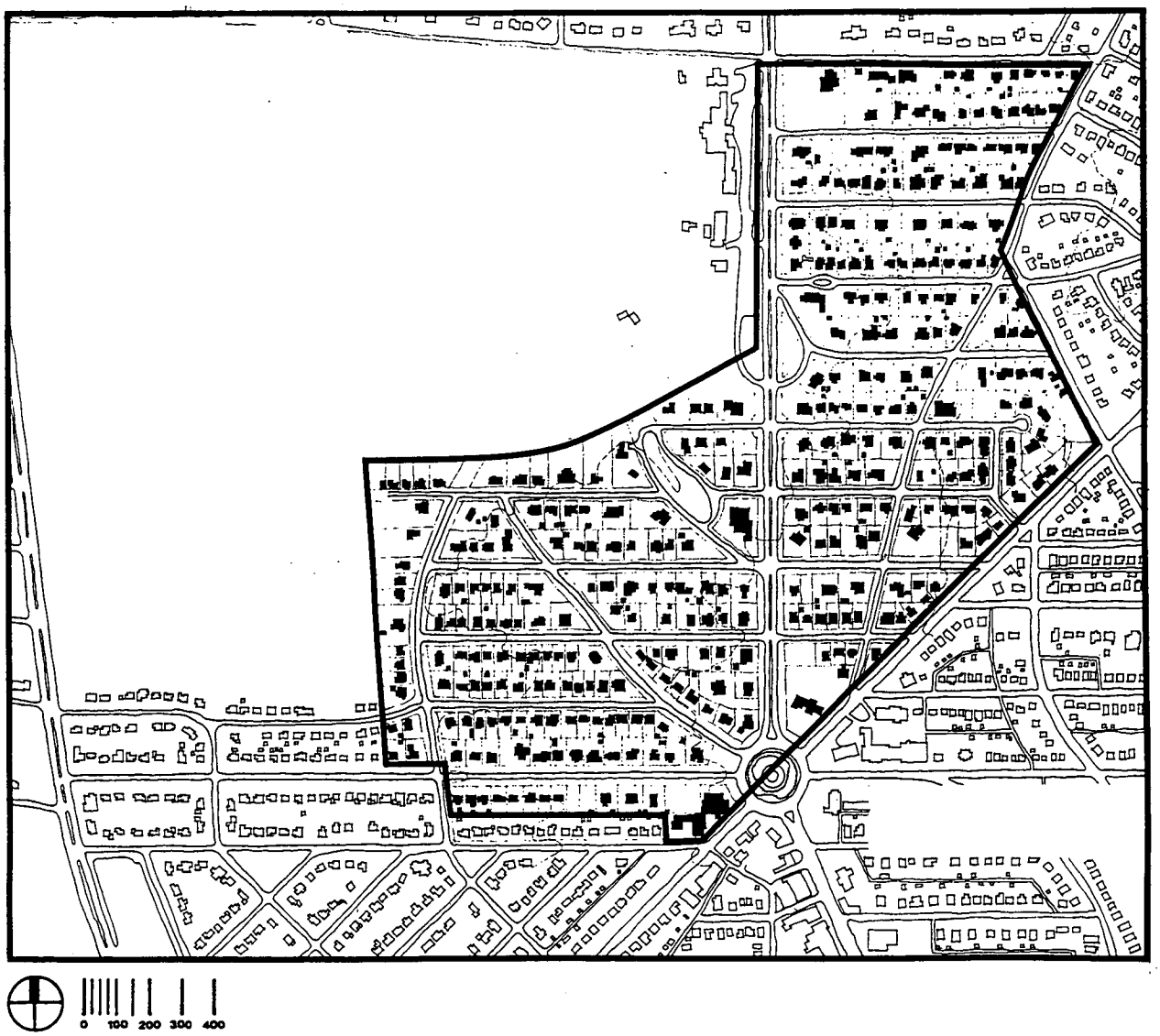
Relationship to Context

The curvilinear or picturesque layout of streets is unique in the area. This neighborhood is linked to the surrounding areas by transit and a single highway.

CHEVY CHASE VILLAGE Montgomery County, Maryland

Developer: Chevy Chase Land Company

Architect/Planner: Nathan Barrett with Lindley Johnson and Leon E. Dessez, 1892.



In contrast with the railroad neighborhoods of Kensington and Garrett Park, this trolley oriented neighborhood allows the development to be oriented around several stops along a central street. Chevy Chase Village was part of an initial purchase of over 1,700 acres of farmland by the Chevy Chase Land Company. The initial phase of development required construction of Connecticut Avenue and a trolley line for approximately five miles to connect this neighborhood to the center of Washington, D.C. The first section, Chevy Chase Village, was opened in 1893. Many of the concepts established in Roland park were applied in this neighborhood.

Summary of Patterns

a. Transit Orientation - The center of this neighborhood was based around Chevy Chase Circle and the nearby trolley station. Additional trolley stops along Connecticut Avenue linked directly with the east-west oriented structure of blocks.

b. Street and Pedestrian System - Chevy Chase Village has a regular grid system with an overlay of three radial streets. The grid system is perpendicular to Connecticut Avenue. The narrow portion of the blocks are located along Connecticut Avenue to maximize access to transit. Sidewalks are located along all streets.

c. Open Space System - Chevy Chase Circle is the dominate open space feature.

d. Land Use System - Single-family detached houses predominate. Commercial uses were specifically excluded. A small town hall and library are located within this neighborhood

Relationship to Context

Other development of the Chevy Chase Land Company adjoin this neighborhood. Chevy Chase County Club is located along the northwestern border.

Contemporary Examples

This section examines three recent examples of transit and pedestrian oriented neighborhoods. Three neighborhoods were selected to demonstrate a range of neighborhood prototypes. These neighborhoods also represent different approaches to the planning of the transit and pedestrian oriented neighborhood. Each of these neighborhoods relies on rail or bus transit. Providing for the pedestrian by such measures as increasing the width of sidewalks, establishing special streetscape features, and creating direct access to transit are key elements found in each of these neighborhoods. In addition, each of these neighborhoods contains a significant mix of uses. The three contemporary examples, which range from high to low density, include:

Carlyle ..... Alexandria, Virginia

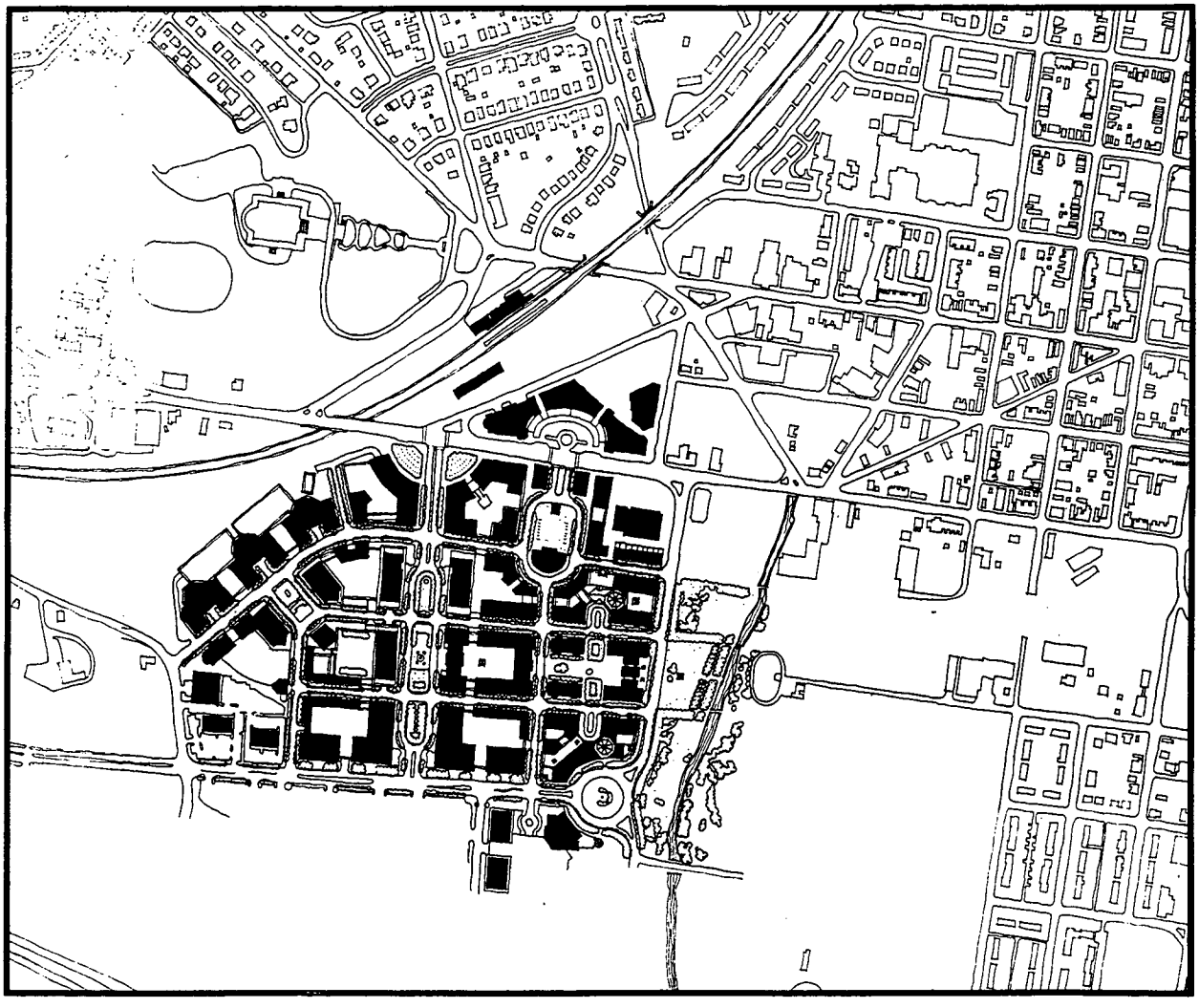
Laguna Creek Ranch ..... Sacramento, California

Avalon Park ..... Orlando, Florida

CARLYLE Alexandria, Virginia

Developer: Oliver T. Carr and the Norfolk Southern Corporation

Architect/Planner: Cooper, Robertson and Partners



The Carlyle is a high density, mixed use neighborhood located adjacent to the King Street Metro station. The Alexandria City Council recently approved the plan for this neighborhood. Carlyle is located on an 86-acre site presently occupied by rail yards and industrial buildings. This neighborhood is an example of an "urban quarter" which uses historic, occasionally baroque, cityscape concepts, a legible pattern of streets, axial views, enclosed circles, courtyards, and plazas. The scale of this neighborhood is based on a ¼-mile walking distance to transit.

The development team working with the Alexandria City Council created a new set of zoning regulations for this neighborhood. These regulations establish site specific conditions, including design guidelines and detailed site plans that describe and mandate an urban district. The approval establishes a permanent design covenant on the land.

Summary of Patterns

a. Transit Orientation - Two Metro stations are located within walking distance of all portions of this "urban quarter." A special transportation mitigation agreement was created to encourage the use of transit and car pools. Sidewalks along the major streets lead directly to the King Street Metro station.

b. Street and Pedestrian Pattern - The overall street and block pattern is a simple grid. Major north-south boulevards surround open spaces which provide centers of activity. The pedestrian network, with wide sidewalks and parks, is an integral part of the street system.

c. Open Space Structure - A series of five major open spaces serve as centers of pedestrian activity. Open spaces also improve the pedestrian link to the Metro station. A waterway will form the eastern edge of this future neighborhood.

d. Land Use System - This high density neighborhood contains a balance of office and housing uses. This neighborhood also includes a substantial amount of retail space, a federal court house, a large hotel, day care, theater and underground parking. Housing and office uses are mixed with retail on the ground level. High-rise apartment buildings will be constructed around open courtyards.

e. Development Standards - Buildings vary in height from 40 to 200 feet. The approved plans have block-by-block standards that mandate architectural design features, placement of lobbies, location of parking entrances, building heights, and setbacks for each of the 16 blocks.

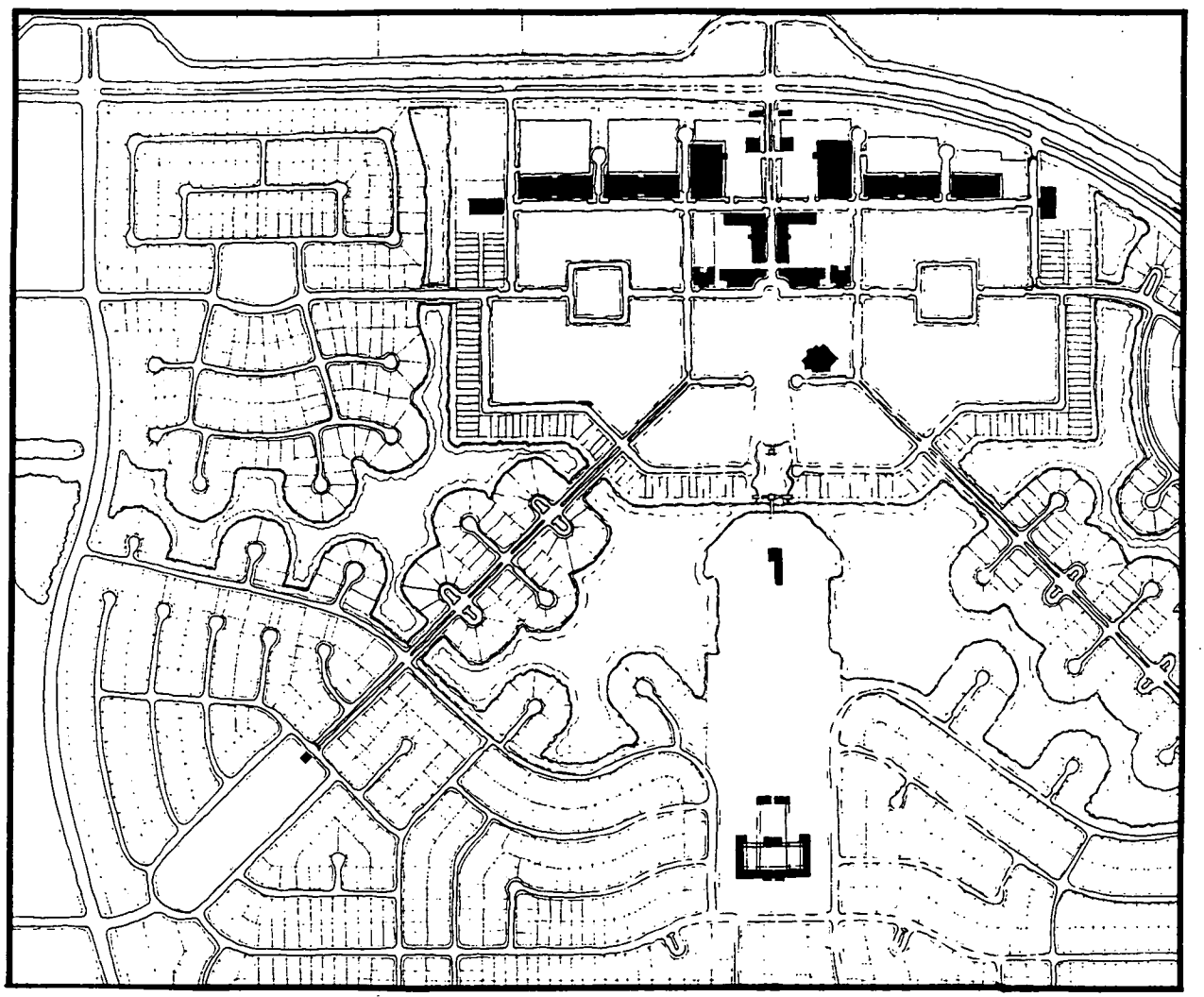
Relationship to Context

The street pattern of Carlyle is intended to extend the existing street pattern of Alexandria. The open spaces along Duke Street will act as a nucleus for future development in adjacent areas.

LAGUNA CREEK RANCH Sacramento, California

Developer: AKT Development Corporation, River West Developments, and Lexington Homes

Architect/Planner: Calthorpe Associates, 1990.



Laguna Creek Ranch is a medium density, mixed use neighborhood oriented to light rail and express bus service. This neighborhood is intended as an application of the principle of the "pedestrian pocket" described earlier in this study. The major goal of this neighborhood is to create an environment where homes, schools, civic uses, and shops are within easy walking distances. Providing pedestrian access to transit is a key feature of Laguna Creek Ranch. This neighborhood has been designed to make the streets and common open spaces more comfortable and inviting to the pedestrian. In summary, Laguna Creek Ranch is intended to be a transit and pedestrian oriented neighborhood.

National attention has been focused on this neighborhood as a prototype for how neighborhoods could develop in the future. New standards for streets and sidewalks were a necessary requirement to allow the principles of the pedestrian pocket to be realized. Pavement widths have been reduced and shade trees have been provided for the comfort of the pedestrian.

Summary of Patterns

a. Orientation to Transit - The town center, streets, and open spaces are oriented directly to a future transit station. The layout is based on the ease of the pedestrian travel throughout the neighborhood to the future transit station and retail area.

b. Street and Pedestrian Pattern - This neighborhood includes radial boulevards that connect all portions to the town center. Lakefront streets provide access to the lake for everyone. Local streets are designed for the comfort of pedestrians as well as the automobile. While retaining culs-de-sac, these local streets connect to parks, the lakefront, and the town center. Sidewalks are located along all streets.

c. Open space - The open spaces serve as focal points for the community. A village green serves the town center. Two active recreation areas and a public school provide focal points for other portions of this neighborhood.

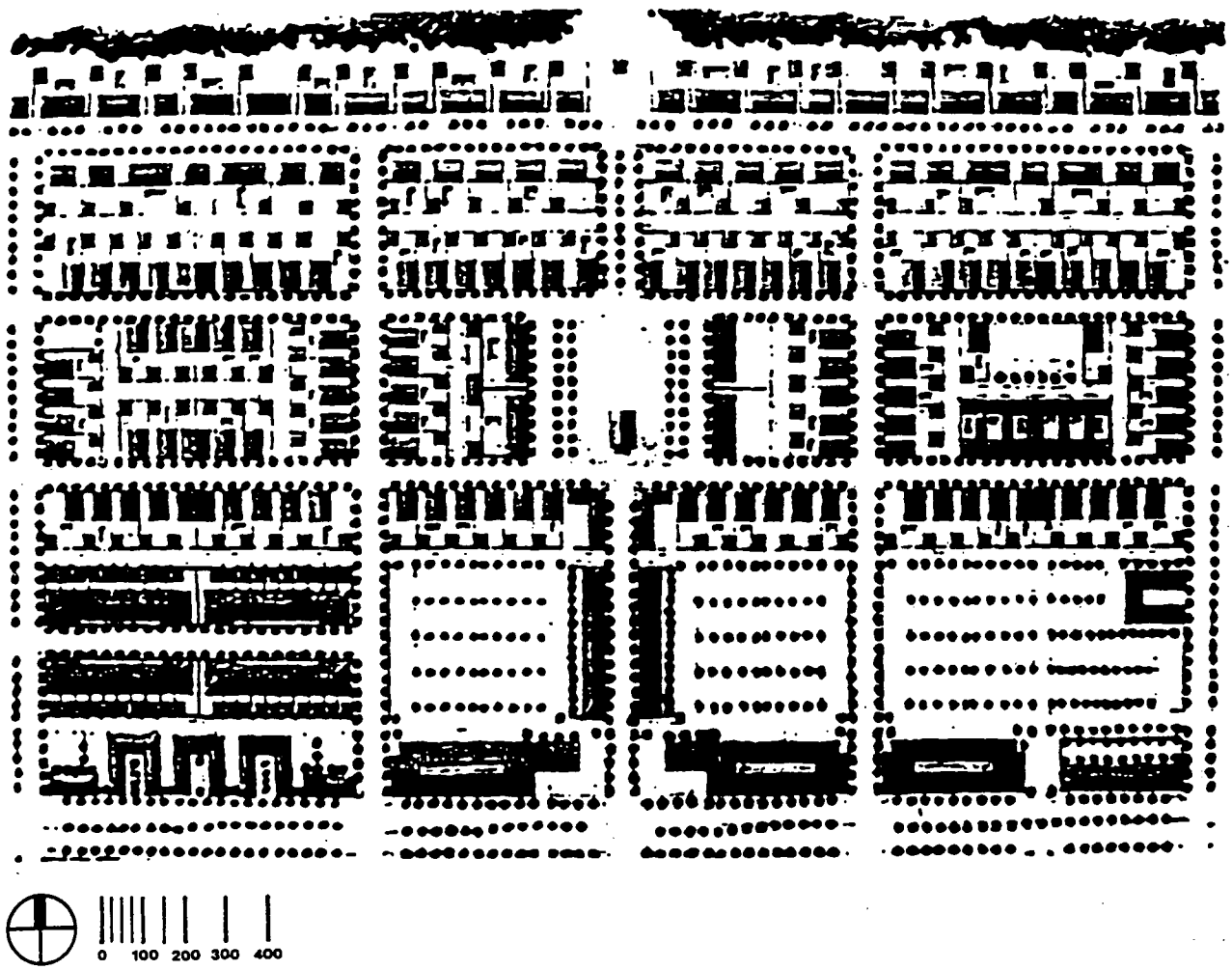
d. Land Uses - A town hall, shops, library, day care, and a range of housing types are located in the town center. A light industrial area and a business park provide job opportunities near the town center. The lower density housing is located at the edge of this neighborhood.

Relationship to Context

The inward focus and the major highways located at the edge separate this neighborhood from the surrounding area. Streets within this neighborhood do not connect to adjacent areas.

AVALON PARK Orlando, Florida

Architect/Planner: DPZ (Andres Duany and Elizabeth Plater-Zyberk), 1990.



Avalon Park is the final neighborhood example in the case study. It is an example of a lower density, mixed use neighborhood oriented to bus service. This neighborhood was designed as a neo-traditional neighborhood by the influential firm of DPZ. Their solution for Avalon Park applies 18th and 19th century town planning models to produce a transit and pedestrian oriented town. The 9,400-acre site, located outside Orlando, includes several neighborhoods in an environmentally sensitive area. The map shows the center of one of these neighborhoods. A local example of a neo-traditional neighborhood is Kentlands. Avalon Park was used in this study because it is one of the few examples of neo-traditional neighborhood planning that has an orientation to transit.

Summary of Patterns

a. Transit Orientation - An express bus loop was established for the entire development with key stops in the center of each neighborhood.

b. Street and Pedestrian Pattern - A rigid grid system is used to form blocks. Alleys provide access for all residences, including single-family detached homes. The ¼-mile walking distance is the basic determinate of size.

c. Open Space - A central town green is the major public open space inside each neighborhood. Natural features provide separation between neighborhoods.

d. Land Use System - Land uses are arranged in a pattern similar to the "pedestrian pocket." Civic, retail, and higher density residential uses are located around the town green. Lower density housing is located near the edges. This neo-traditional example borrows from the architectural forms of the regional area to establish a consistent scale and an appropriate architectural style.

Relationship to Context

Avalon Park is located outside Orlando, Florida. As a large scale development, it attempts to establish a series of self-contained neighborhoods.

SUMMARY OF FINDINGS BASED ON THE CASE STUDIES

A series of common elements can be identified from the analysis of the 11 case studies. This section of the report summarizes the key elements of the transit and pedestrian oriented neighborhoods that were studied.

Transit Orientation

a. rail, trolley, or bus transit are included.

b. transit is a major determinate of form:

- radial pattern of streets leading to transit, or
- linear, ladder-like pattern of streets connect to trolley or bus stops.

The following chart summarizes the type of transit and density for each neighborhood.

TYPE OF TRANSIT AND DENSITY

	Type of Transit			Type of Density	
Neighborhood Type	Railroad	Heavy Rail/ Metro	Light Rail/ Trolley	Bus	Density
1. High Density:					
Carlyle	Rail	Subway	—	Bus	1.7 FAR[1]
Back Bay	—	Subway	—	Bus	1.3 FAR[1]
2. Medium Density:					
Hampstead Garden	Rail	—	—	—	8-10 du/ac
Forest Hills	Rail	Subway	—	—	8.0 du/ac
Laguna Creek	—	—	Light Rail	Bus	3.4 du/ac
Kensington	Rail	—	—	Bus	2.3 du/ac
3. Low Density:					
Avalon Park	—	—	—	Bus	—
Riverside	Rail	—	—	—	—
Roland Park	—	—	—	Bus[2]	—
Chevy Chase Village	—	—	—	Bus[2]	2.3 du/ac
Garrett Park	Rail	—	—	Bus	2.1 du/ac

Note: 1 FAR = Floor Area Ratio
2 Electric Trolley was the original form of transit.

Layout or Pattern of Streets

a. Interconnected system (grid or curvilinear) of streets.

b. Pattern of streets leads to a center with a central transit stop (i.e., railroad or subway) or to a series of transit stops along a linear street (i.e., trolley or bus).

c. Regional through traffic located at the perimeter of the neighborhood.

Street Sections and Other Standards

A wide variety of street sections, public rights-of-way, and other standards were found in the case studies. The key findings include the following:

a. Instead of a hierarchy of streets based on traffic volume or width of paving, all streets within the case study of neighborhoods function as "local streets," regardless of traffic volume and width of paving.

b. Streets located on the edge of neighborhoods often function for through traffic.

c. Custom street design features are established in many of the neighborhoods, including a wide range of medians, street tree spacing, and paving materials.

d. Some of the other common design standards include the following:

- parallel parking located along all local streets
- horizontal alignments (45 feet) along some streets
- turning radii (15 feet maximum) at intersections
- buildings located on the edge of public right-of-way in higher density areas.

e. Streets are oriented to minimize walking distance to transit (example: Chevy Chase Village contains narrow intersection spacing along trolley line).

The chart on the following page identifies the street sections found in the case studies.

STREET SECTIONS

SECTION	Carlyle	Back Bay	Forest Hills	Laguna Creek Ranch	Kensington	Roland Park	Garrett Park	Chevy Chase
• 120'-150' ROW 36' divided		•		•	•	•		•
• 100'-120' ROW 26' divided	•							
• 100' ROW 20' divided					•			
• 80' ROW 50' paving	•	•		•				
• 70' ROW 40' paving	•		•	•				
• 70' ROW 36' paving		•		•	•	•		
• 70 ROW 26' paving							•	
• 60' ROW 32' paving			•	•	•	•		
• 60' ROW 26' paving			•					
• 50' ROW 26' paving	•		•		•	•	•	•
• 40' ROW 18' paving			•					
• 20' ROW 20' paving						•		
• ALLEYS		•				•		

Block Topology

a. small blocks with a variety of sizes that range from 180' to 300' in width.

b. buildings front on public streets with garages located behind, regardless of density.

Community Identity and Design

Most of the transit and pedestrian oriented neighborhoods have the following:

a. quality streetscape, including trees, pedestrian oriented lighting, benches, and clearly delineated pedestrian crosswalks.

b. civic open space next to transit stations.

c. an identifiable neighborhood center (i.e., open space, cluster of higher density development or civic building).

d. landmark building or focal point.

e. variety and detail of architecture.

f. decentralized system of small parks and civic open spaces.

Walking Distance to Transit

a. a major portion of the residences are within 1/2 mile of transit.

b. office and retail uses are concentrated at the major transit stop.

Bicycle Systems

a. bicycles share the local streets with automobiles as part of an interconnected system.

b. bicycle storage facilities are often located at the transit stops.

Relationship to Natural Features

a. natural features often create edges for the neighborhoods.

b. concentrating uses near transit often provides for preservation of natural features.

Size and Shape of Centers

a. although the centers vary in size, all neighborhoods have a mixed use center.

b. concentration of higher density housing, retail, office, civic spaces, and office uses are found in higher density centers.

c. landmarks and transit stops are found in the centers.

Development Characteristics

The following items summarize the development characteristics from the selected case studies:

a. the ¼-mile walking distance seems to be the most critical determinant of neighborhood size.

b. all neighborhoods have a mix of uses with the most dense areas containing major employment opportunities.

c. gross residential density varies dramatically between case studies.

d. neighborhood size varies from 76 acres to 230 acres (except Laguna Creek and Riverside).

The chart on the following page summarizes the development characteristics.

The neighborhood size tied to a specific number of community facilities, such as an elementary school, or services, such as a local grocery store, is a planning illusion. The school may have a standard size that is too large for a neighborhood and requires a change of boundaries over time to accommodate changes in population. A neighborhood may be too small to support a local grocery store economically. The support of transit is dependent on total numbers of riders along several lines instead of a specific density in each neighborhood.

DEVELOPMENT CHARACTERISTICS: AREA AND DENSITY

NEIGHBORHOOD	LAND AREA (Acres[1])	BUILDING AREA[2]			GROSS DENSITY[3]
		Commercial (Sq. Ft.)	Residential (Sq. Ft.)	Total (Sq. Ft.)	
1. High Density, Mixed Use Neighborhood					
o Carlyle	86 AC	3,378.000	3,100,000	6,478,000	1.7 FAR
o Back Bay	230 AC	—	—	12,930,000	1.3 FAR
2. Medium Density, Mixed Use Neighborhood					
o Forest Hills	210 AC	Not Available	1,685 DU	—	8.0 DU/AC
o Laguna Creek Ranch	1,000 AC	286,000	3,370 DU	—	3.4 DU/AC
o Kensington	188 AC	287,150	432 DU	—	2.3 DU/AC
3. Low Density, Mixed Use Neighborhood					
o Chevy Chase Village	154 AC	—	346 DU	—	2.3 DU/AC
o Garrett Park	160 AC	5,000	341 DU	—	2.1 DU/AC

Notes:

1. Based on area shown on map.
2. Based on DU's shown on map.
3. Includes total tract (residential, commercial, and open space)

Journey to Work: Summary of Data

This section of the report uses data from the U.S. Census to compare the journey-to-work characteristics of residents in transit and pedestrian oriented neighborhoods with residents in other, primarily adjacent, neighborhoods. For purposes of this section, the physical characteristics of each neighborhood in Montgomery County include the following:

Physical Characteristics of Transit and Pedestrian Oriented Neighborhoods vs. Other Types of Neighborhoods

Transit and Pedestrian Oriented Neighborhoods	Other Type of Neighborhoods
a. Similarities:	
• ½ mile maximum walking distance to transit	• ½ mile maximum walking distance to transit
• identifiable boundaries	• identifiable boundaries
b. Differences	
• start of construction prior to 1910	• start of construction after 1910
• transit oriented in initial stages	• design based on automobile
• mix of uses	• single use
• interconnected system of streets	• dendroid, or "branching," system of streets

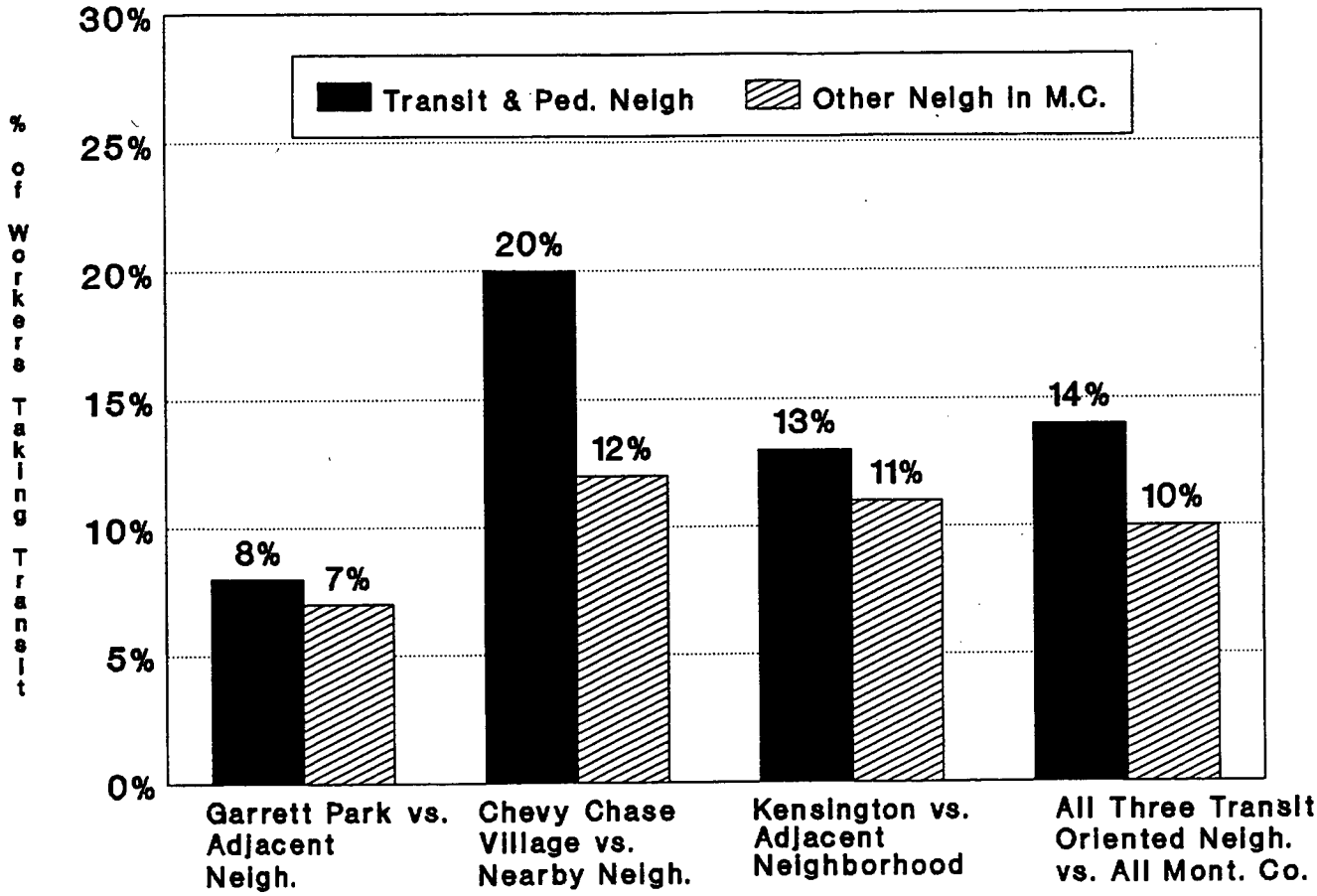
The charts on the following pages identify the increase in workers taking transit and the decrease in workers driving alone for residents in transit and pedestrian oriented neighborhoods compared to other neighborhoods. Neighborhoods in Montgomery County and throughout the United States were compared using the 1980 and 1990 U.S. Censuses. The data indicates the following:

- workers take transit to employment more in transit and pedestrian oriented neighborhoods than other neighborhoods, even with the same proximity of transit facilities (increase in transit use varies from 8 percent to 45 percent).

- workers tend to drive alone to work less frequently in transit and pedestrian oriented neighborhoods than other neighborhoods (decrease in workers that drive alone varies from 3 percent to 12 percent).

WORKERS TAKING TRANSIT IN 1980

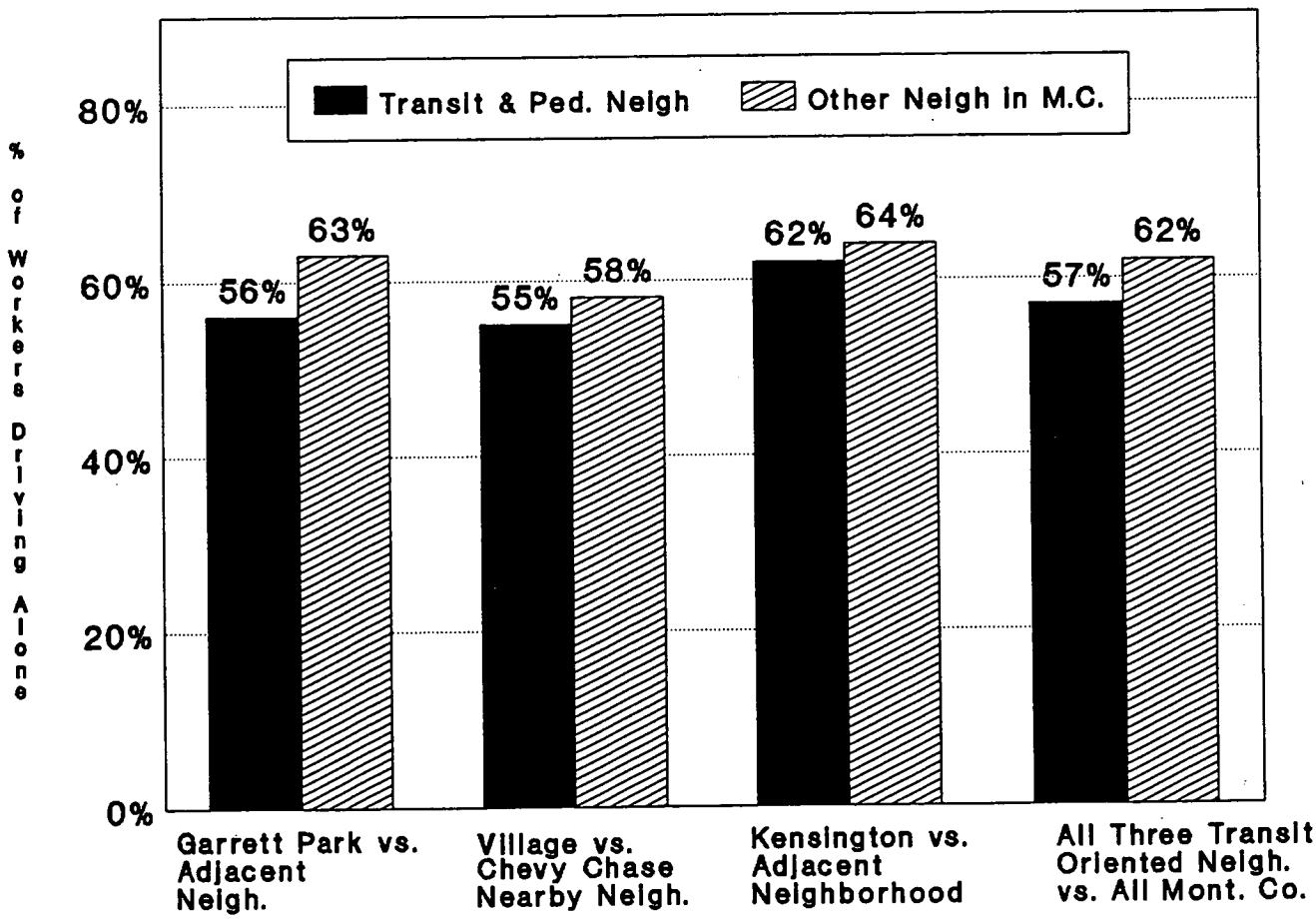
Transit and Pedestrian Oriented Neighboords Versus Other Neighborhoods in Montgomery County



Source: 1980 U.S. Census

WORKERS DRIVING ALONE IN 1980

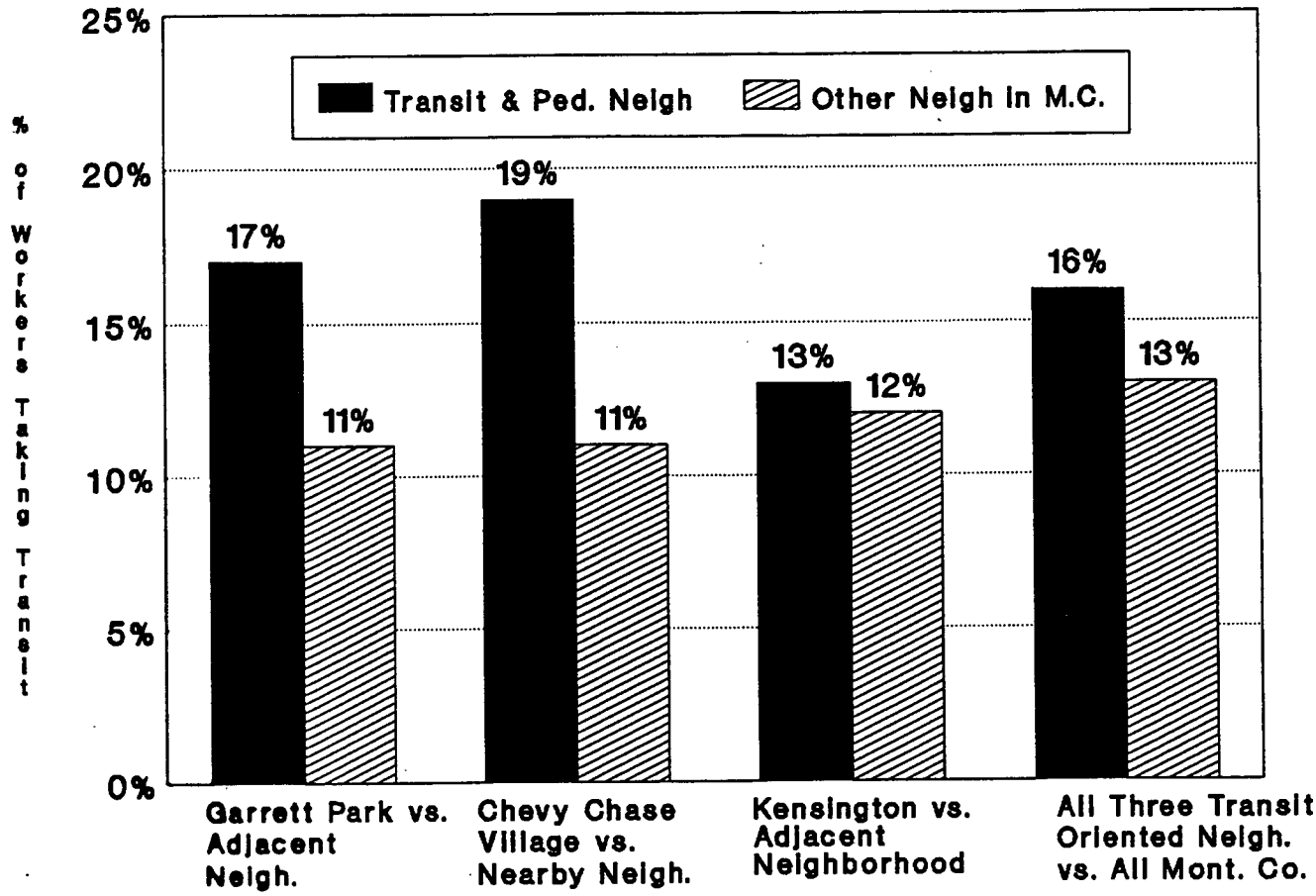
Transit and Pedestrian Oriented Neighboords Versus Other Neighborhoods in Montgomery County



Source: 1980 U.S. Census

WORKERS TAKING TRANSIT IN 1990

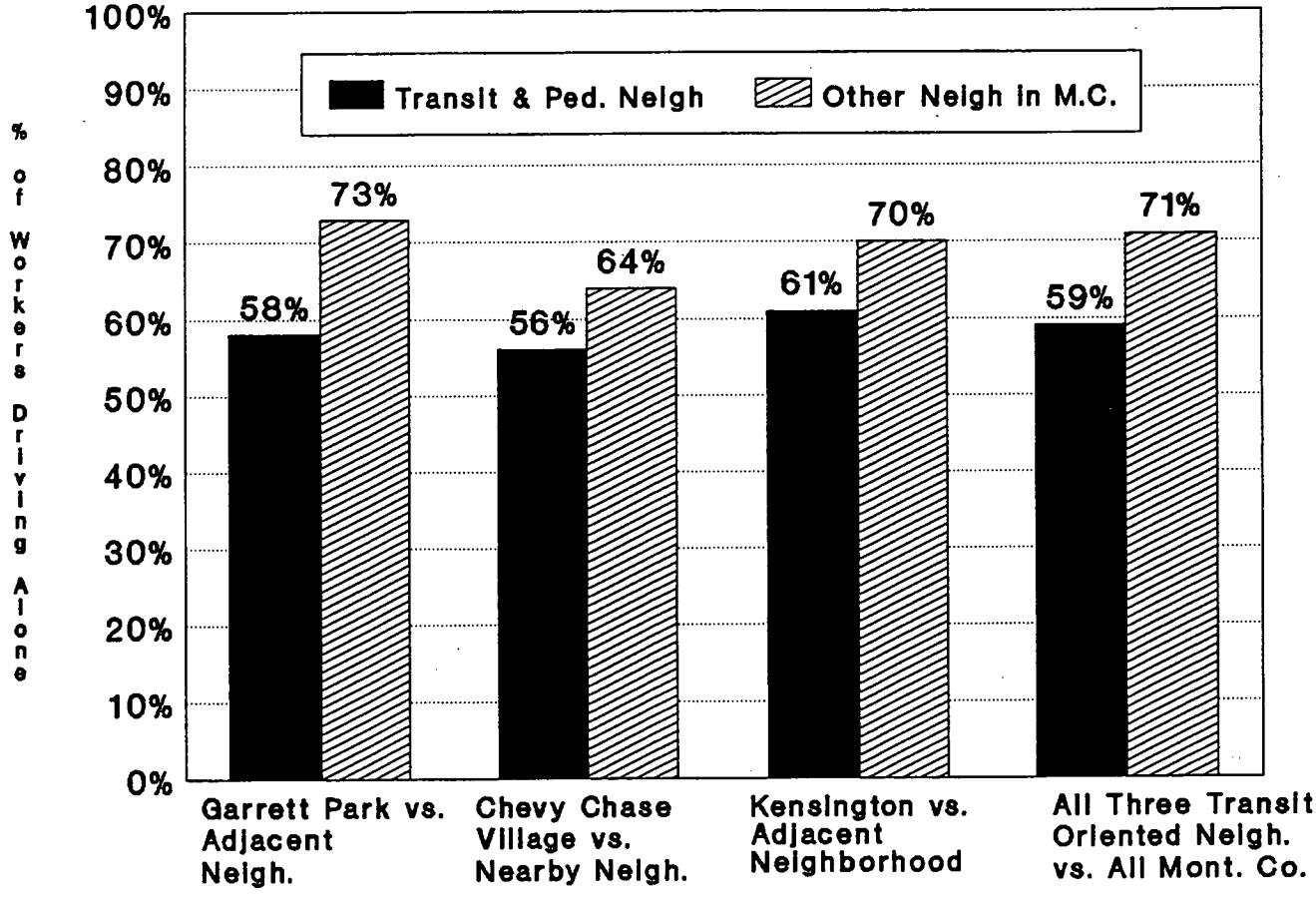
Transit and Pedestrian Oriented Neighboords Versus Other Neighborhoods in Montgomery County



Source: 1990 U.S. Census

WORKERS DRIVING ALONE IN 1990

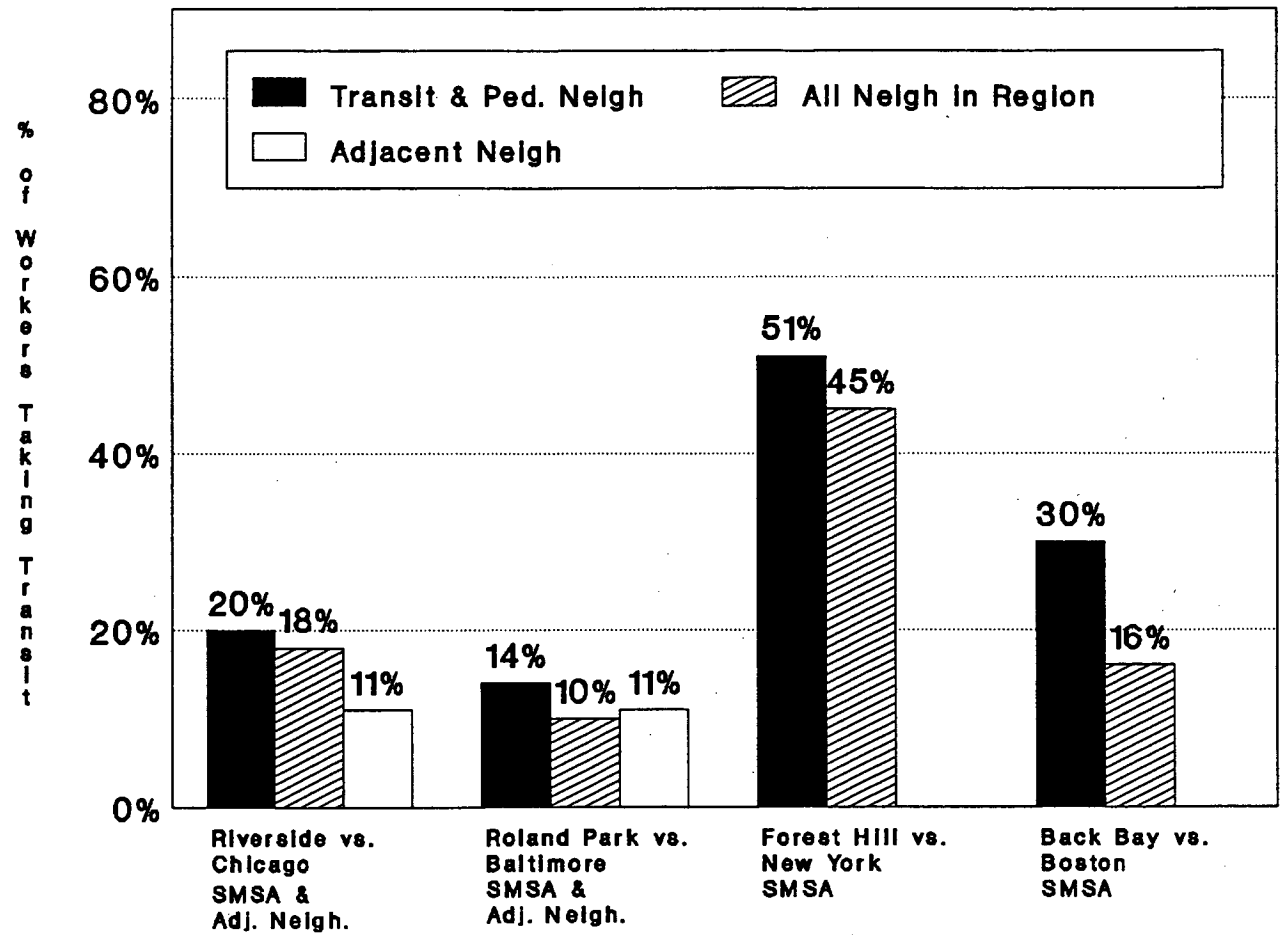
Transit and Pedestrian Oriented Neighboords Versus Other Neighborhoods in Montgomery County



Source: 1990 U.S. Census

WORKERS TAKING TRANSIT 1980

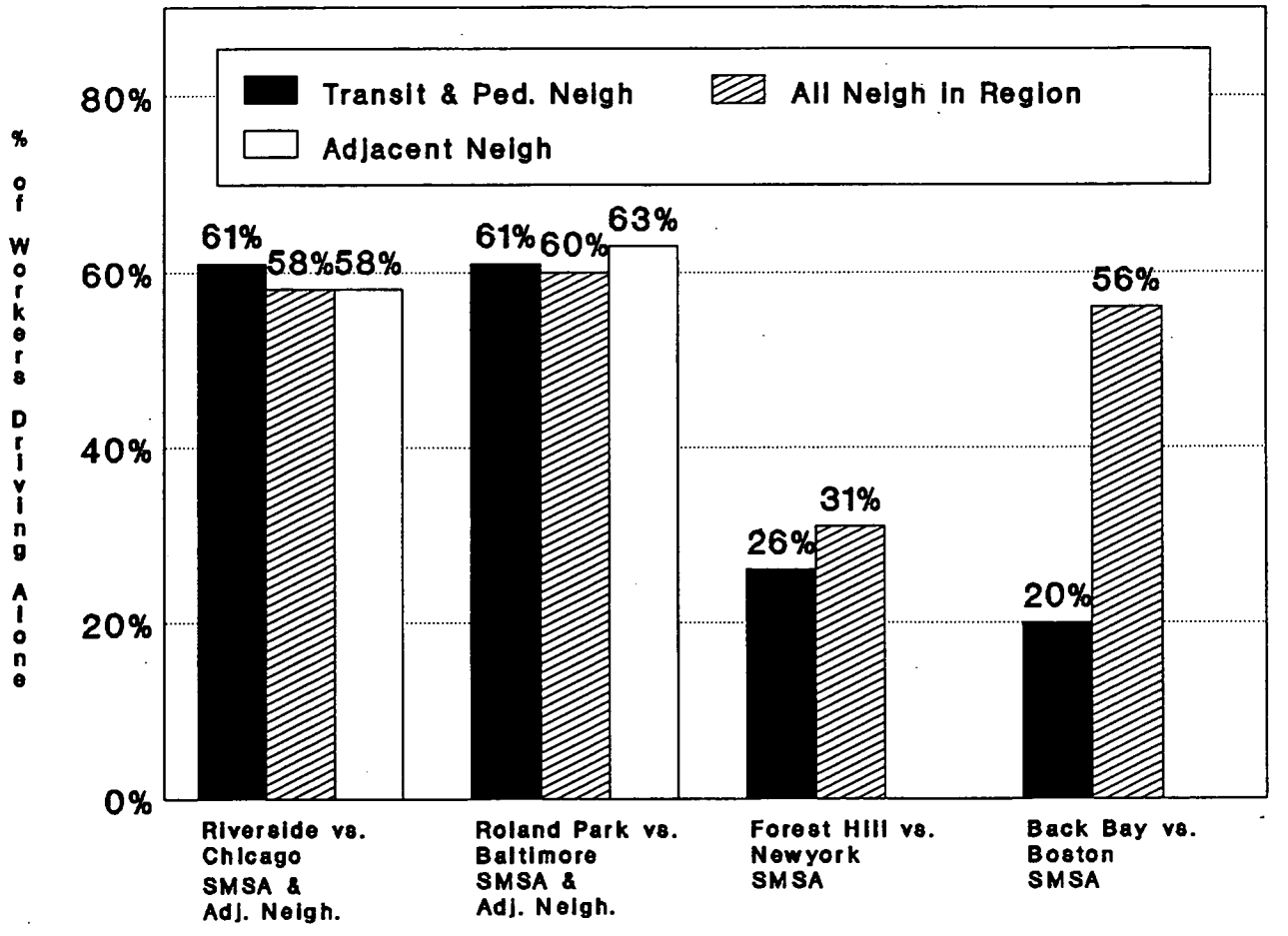
Transit and Pedestrian Oriented Neighboords Versus Other Neighborhoods - National Examples



Source: 1980 U.S. Census

WORKERS DRIVING ALONE IN 1980

Transit and Pedestrian Oriented Neighboords Versus Other Neighborhoods - National Examples



Source: 1980 U.S. Census

NEIGHBORHOOD PRINCIPLES AND APPLICATIONS IN MONTGOMERY COUNTY

Sasaki Associates, Inc.
Watertown, Massachusetts

INTRODUCTION

This report includes two major sections. The first section identifies a set of transit and pedestrian oriented design principles based on the previous analysis of case studies. The second section is the application of the design principles. In the application section, opportunities in Montgomery County are identified and sample designs are provided for each of three neighborhoods.

PRINCIPLES

Elements which encourage the use of transit and increase pedestrian orientation are identified in the following paragraphs. These elements are intended to establish a set of planning principles that would foster the creation of neighborhoods, save provide an identifiable center for community life, improve pedestrian circulation, and increase access to transit. The transit and pedestrian oriented planning principles based on the case studies include the following:

Create an Identifiable Center for Each Neighborhood

Establish an identifiable center with transit access, a mix of uses, and civic open space to create a focus for each neighborhood.

Provide a Mix of Uses

Retail shops, offices, residences, and community facilities such as parks and schools are elements that foster a sense of community and encourage interaction among workers and residents. Locating this mix of uses within walking distance of all portions of a neighborhood will increase pedestrian orientation.

Establish an Interconnected System of Local Streets

An interconnected system of local streets within neighborhoods will provide more direct access for pedestrians, bicyclists, and vehicles to all areas of the neighborhood, including transit stops, civic spaces, employment areas, and residences. This system of local streets also needs to be connected with the roadway and transitway networks that provide access to other neighborhoods. Major roadways should not pass through the center of a neighborhood to reduce conflicts among pedestrians and local vehicular circulation with through traffic.

Provide a Diversity of Housing Types

A wide range of housing in close proximity, preferably in small clusters on adjacent blocks or within each block throughout the neighborhood, should be encouraged to avoid large concentrations of any single type of housing and increase the potential for pedestrian connection between diverse housing types.

Provide a Mix of Active and Passive Open Spaces

A mix of active and passive open space areas should be established within walking distance of all uses to provide opportunities for pedestrians to have access to a wide range of recreational activities within each neighborhood. Active open spaces include large open play fields, local parks, civic spaces, and small recreation areas. Civic spaces should be located near transit stops. Passive open spaces should be located near the boundaries of neighborhoods to preserve natural features.

Orient Buildings to Streets, Transit Routes, and Walkways

Buildings should be clustered along streets within neighborhoods. This approach will facilitate pedestrian movement between buildings and reduce the walking distance between buildings and transit stops located along streets and roads. A safe and attractive neighborhood environment along streets that encourages pedestrian travel along the sidewalk will also be established. The pedestrian system should not rely upon

internal walkways through parking areas or rear yards to improve safety and reinforce street oriented development.

Locate Transit Stops Within Walking Distance of Most Activities

Transit stops and stations should be located within a ½-mile walking distance (approximately 10-minute walk) of most portions of transit and pedestrian oriented neighborhoods.

Design the Public Right-of-Way for Streets to Accommodate a Variety of Transportation Modes

The public right-of-way for local streets in transit and pedestrian oriented neighborhoods should accommodate pedestrians, bicyclists, and transit vehicles in addition to other vehicles. Local streets should also provide a sense of place and increase opportunities for social interaction. The public right-of-way for roads, including major highways and arterials, should give priority to vehicles within the paved roadway while providing for parallel areas for transitways, bikeways, and sidewalks.

APPLICATION

The application portion of this report applies the transit and pedestrian-oriented design principles to specific sites in Montgomery County. Although three specific sites were selected, each site was intended to be representative of a common set of problems and opportunities frequently encountered in Montgomery County. The emphasis in the design exercises is on highlighting the opportunities for the private sector and examining the regulatory techniques necessary to allow the creation of transit and pedestrian oriented neighborhoods.

Opportunities in Montgomery County

a. Range of Neighborhood Types

This study is concerned with the range of neighborhoods in Montgomery County located outside the central business districts and outside the rural areas. Three types of neighborhoods applicable to the range of neighborhoods found in Montgomery County were selected. They are the tract, village, and transit center.

- Type I: The transit center neighborhood is a high density, mixed use neighborhood immediately surrounding a Metro transit station. The review of the case studies found that pedestrians will walk further to a Metro station than to local bus stops, particularly if their trip is to another sector of the metropolitan area. Therefore, it is reasonable to expect that this type of transit stop can have a significant draw, even out to the range of a 15-minute walk. The area within a 15-minute walking radius of the station (1,950 feet) is 275 acres. The actual size of a transit center neighborhood will usually depend on the amount of land available at the time the stop is constructed. Most

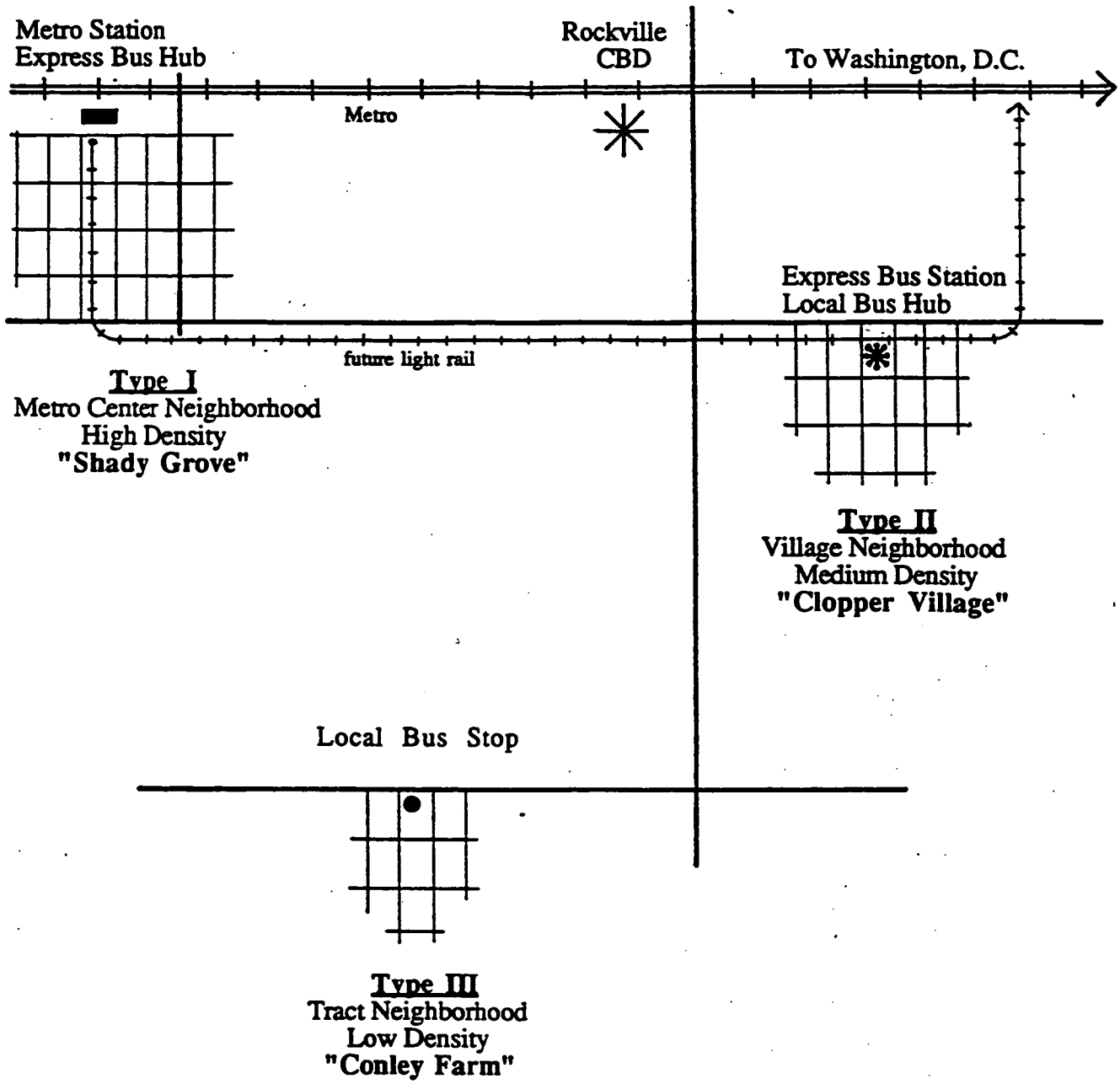
areas of this type will consist of numerous property owners and the overall urban pattern will be dependent on a public master plan for coordination of development and redevelopment. A transit station in an outlying suburban area generates the potential for the development of a new high intensity center containing employment, retail, and higher density housing. Our example of a high density, mixed use neighborhood at a transit station is Shady Grove. Other examples in Montgomery County include Twinbrook, White Flint, Grosvenor, and the future Germantown Town Center.

- Type II: The village scale of development is an area that frequently relies on adjacent residential areas to support the services and facilities found in its village center. A village center should encourage multiple purpose trips and be conveniently served by public transit. Express bus service from the village center will often take patrons to employment centers, more intense retail services, and sometimes a Metro station. The area served by the express bus stop within a 10-minute walking distance (1,300 feet) is 125 acres. Villages provide a mix of many housing types serving a wide range of income levels and family living situations. They also include retail centers with a grocery store and specialty shops. They could also include small employment centers. Our prototypical village is Clopper Village.

- Type III: The tract scale of development often includes an area of 50-100 acres that is part of a larger residential district. This is the neighborhood scale at which most development projects occur in expanding suburban communities. A large number of these projects come before the Montgomery County Planning Board for approval each year. Coordination with adjacent developed areas is very important, even though frequently inhibited by a myriad of difficulties—including irregular property boundaries, individual developer objectives, and experience, economics, and concerns of adjoining residents. These subdivisions should be designed to encourage the use of public transit, even if a local bus stop will not be provided at the outset. The area within a 5-minute walking distance (650 feet) is 30 acres. Local bus stops can usually be anticipated. A tract should be designed so all properties are within a 5-10 minute walk of a bus stop. The prototypical tract is Conley Farm.

The three types of neighborhoods can be diagrammatically illustrated as shown on the following page. The diagram shows the basic relationships in the County of these three neighborhood types. There are a limited number of transit stations in the County. As an order of magnitude example for perceptual understanding, there would be several medium density village center neighborhoods associated with a single transit station and several (maybe 15-20) low density tract neighborhoods associated with each village center neighborhood. This spatial array of neighborhoods, therefore, associates as many as 300 tract neighborhoods with a single Metro station. Thus, the interconnected system described provides all residents with public transit access throughout the metropolitan area. Public transit therefore becomes a more viable means of transportation for work, shopping, and leisure trips if the overall extent, frequency, and direction of transit service can be provided.

Illustration: Spatial Relationships of Neighborhood Types



b. Range of Transit Service Hierarchy

The transit technologies that are available in Montgomery County include "heavy rail" (i.e., Metro and MARC systems), future "light rail," express bus, and local feeder bus facilities. These different technologies are combined to provide a hierarchial system. This study is intended to demonstrate the neighborhood design opportunities that can relate to the different classes of the hierarchy of transit facilities found in Montgomery County.

The neighborhood examples include the following range of transit facilities:

- Example I regional rail transit with connecting express feeder bus facilities.
- Example II arterial express bus with connecting local bus facilities.
- Example III local bus service.

c. Range of Residential Densities and Commercial Intensities

A wide spectrum of residential densities and commercial intensities can be examined within the neighborhoods of Montgomery County. For purposes of this study, the following densities and intensities are explored in the three types of neighborhoods:

- Example I high density neighborhood (40 du per acre) with a mix of employment and residential uses (1.0 FAR).
- Example II medium density neighborhood (6-10 du per acre) with retail and low intensity office uses.
- Example III low density neighborhood (4 du per acre) with low intensity retail and civic uses.

d. Designs for Three Neighborhoods in Montgomery County

The following pages include test designs for three neighborhoods in Montgomery County. The three sites selected for the design study are all undeveloped properties. Because the County contains the full range of land resources from downtown areas to rural farmland, future opportunities for development of transit and pedestrian oriented neighborhoods will exist for similar sites in the decades ahead.

The design examples illustrate how the design principles derived from the analysis of the case studies can be used in the design of neighborhoods in Montgomery County. They can be used as examples of desirable design direction by County officials and potential developers. These examples also served as an effective tool to discover needed changes to standards and regulations to fully achieve the desired results.

Shady Grove Neighborhood—Example I: High Density, Mixed Use Neighborhood with a Metro Station

Opportunities for the development of transit and pedestrian-oriented neighborhoods outside the central business districts and along rail transit lines are available in the North Bethesda, Shady Grove, and Germantown planning areas. The recent Shady Grove Master Plan identified the Shady Grove Metro station area as a potential site for the development of a mixed-use, transit, and pedestrian oriented neighborhood.

For the purposes of this study, the following design program was developed for this site based on the recommendations in the Shady Grove Master Plan.

a. Design Program

Item	Guidelines
Tract Area	
Metro area	40 acres
All other areas (approximate)	40 acres
TOTAL	80 acres
Residential (multi-family & townhouses)	
Metro area	1,000 du's
All other areas	700 du's
TOTAL	1,700 du's
Commercial (office & retail)	
Metro	1,000,000 s.f.
All others areas	1,000,000 s.f.
TOTAL	2,000,000 s.f.
Local park/civic space	10 acres

b. Transit and Pedestrian Facilities

- Metro station
- Light rail station
- Express and local feeder bus system along Redland Road and MD 355
- Bicycle connections along transit way from transit station to King Farm

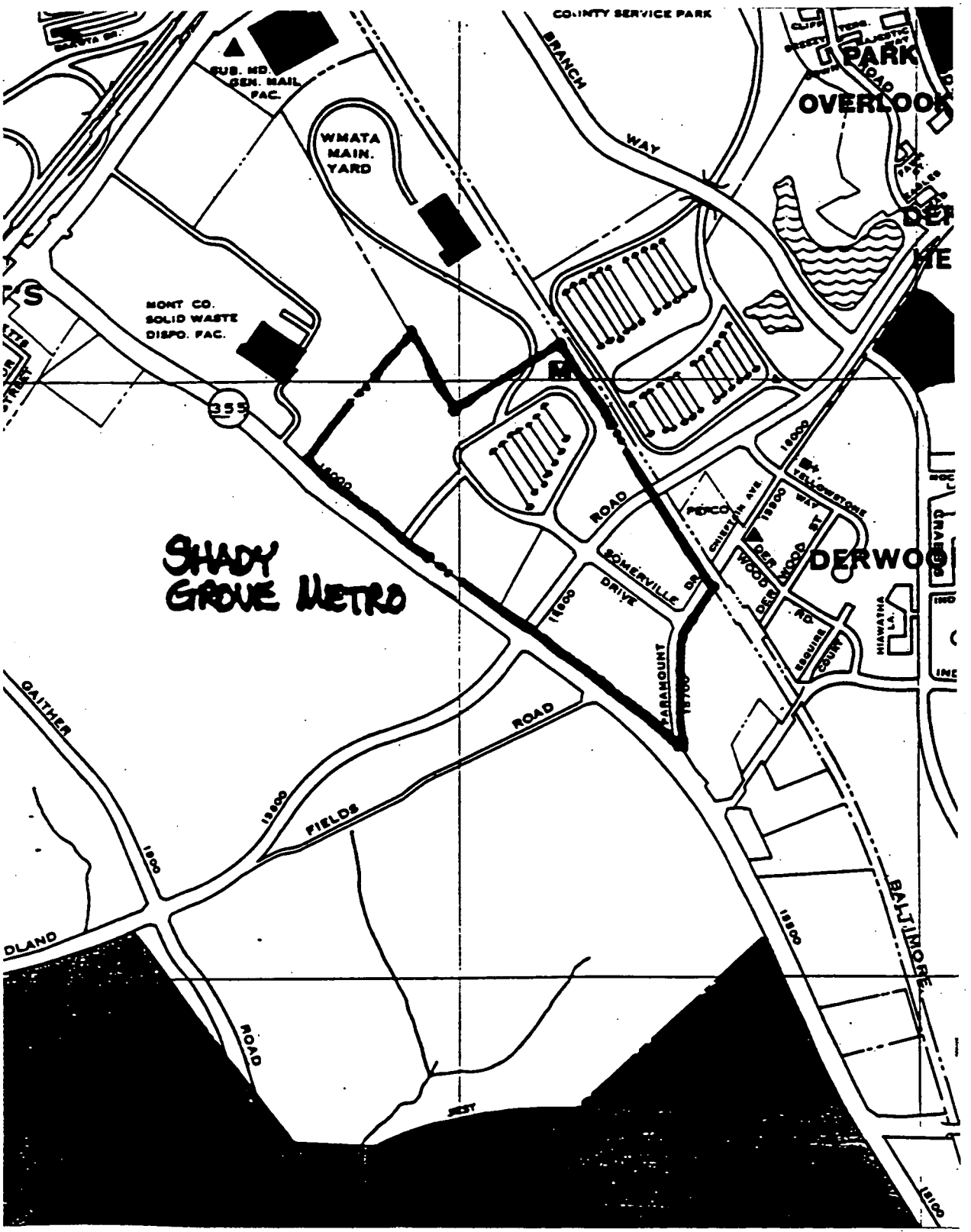
c. Site Factors Shaping Design Direction

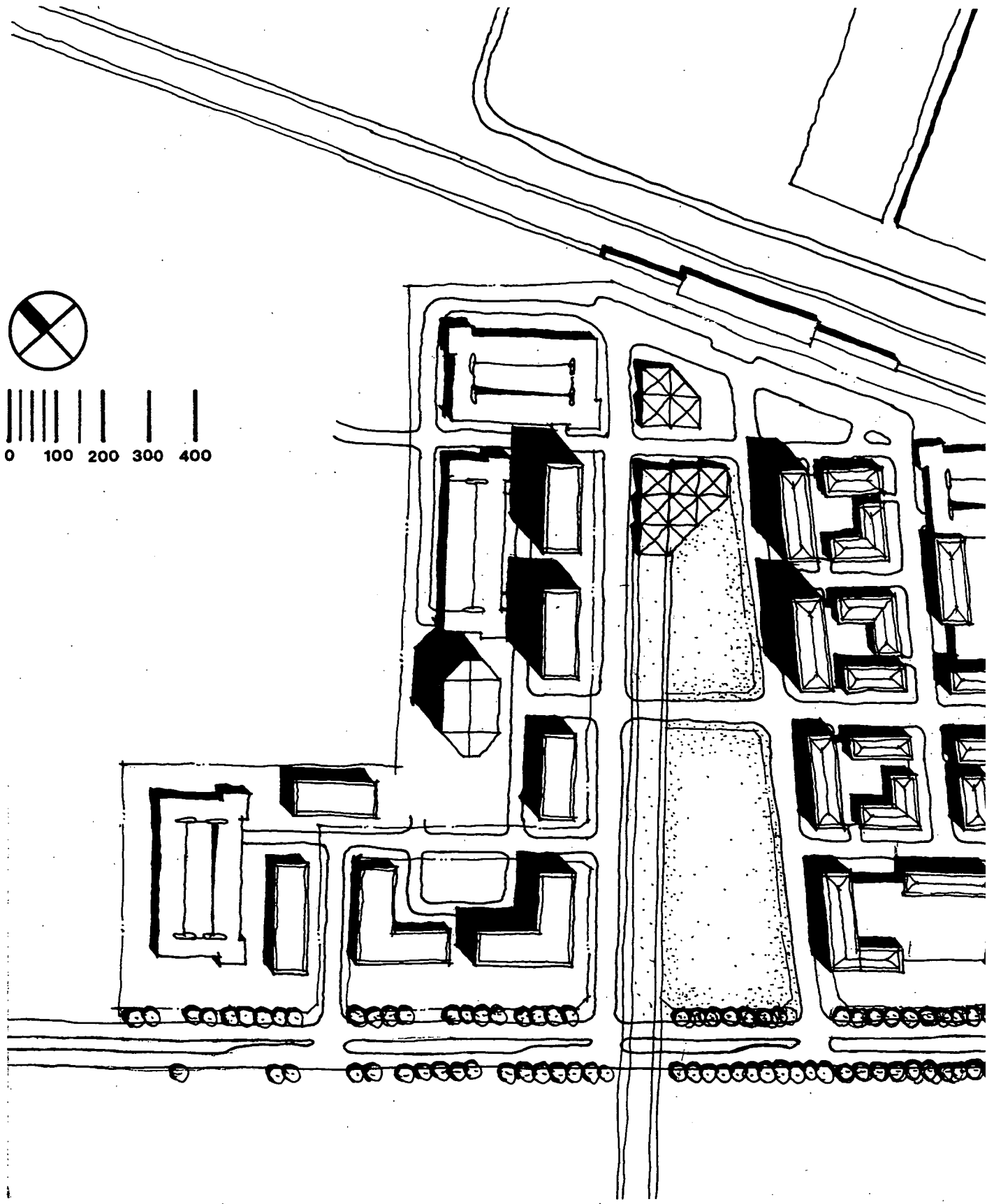
- The WMATA Maintenance Yard is an adjacent use to the northwest. It is close to the Metro station on the same side of the tracks.
- The Montgomery County Solid Waste Disposal Facility is also adjacent to the parcel located between the WMATA Maintenance Yard and MD 355.
- The site is bordered on its long dimension to the south by MD 355.
- The termination of the future Shady Grove area light rail is at the Shady Grove Metro station. This proposal is part of the Shady Grove Master Plan adopted by the Montgomery County Council in 1991.
- Existing highway oriented commercial uses along MD 355 are assumed to be redeveloped as the parcel is developed.
- Redland Road is a major north-south arterial bisecting the site with a major intersection at MD 355.
- The bus station and some commuter parking will remain on the site.
- Train operations, noise, and other associated environmental considerations impact the northern property boundary area.

d. Essence of Design Concept

- A major park links the Metro station visually from MD 355, a distance of ¼ mile. This open space organizes use of the site, gives it design form, and provides a unique identity for this place.
- A retail complex terminates the open space just in front of the Metro station. The light rail line terminates at this location providing easy transfer to Metro-rail or bus. A parking garage between the retail complex and the WMATA Maintenance Yard to the north buffers negative impacts from the yard and provides parking for commuters and commercial uses.
- "Main Street" is established perpendicular to Redland Road extending north-west parallel to MD 355 and terminating at Metro Center Park. A cinema and restaurant complex occurs at this termination of Main Street with office space in these commercial buildings above street level.
- Retail uses exist along frontages on both sides of Main Street and along the east side of Metro Center Park to the Metro station with residential uses on upper levels. The retail uses on the west side of Metro Center Park have office use above.
- Multi-mode public rights-of-way.

Shady Grove Location Map

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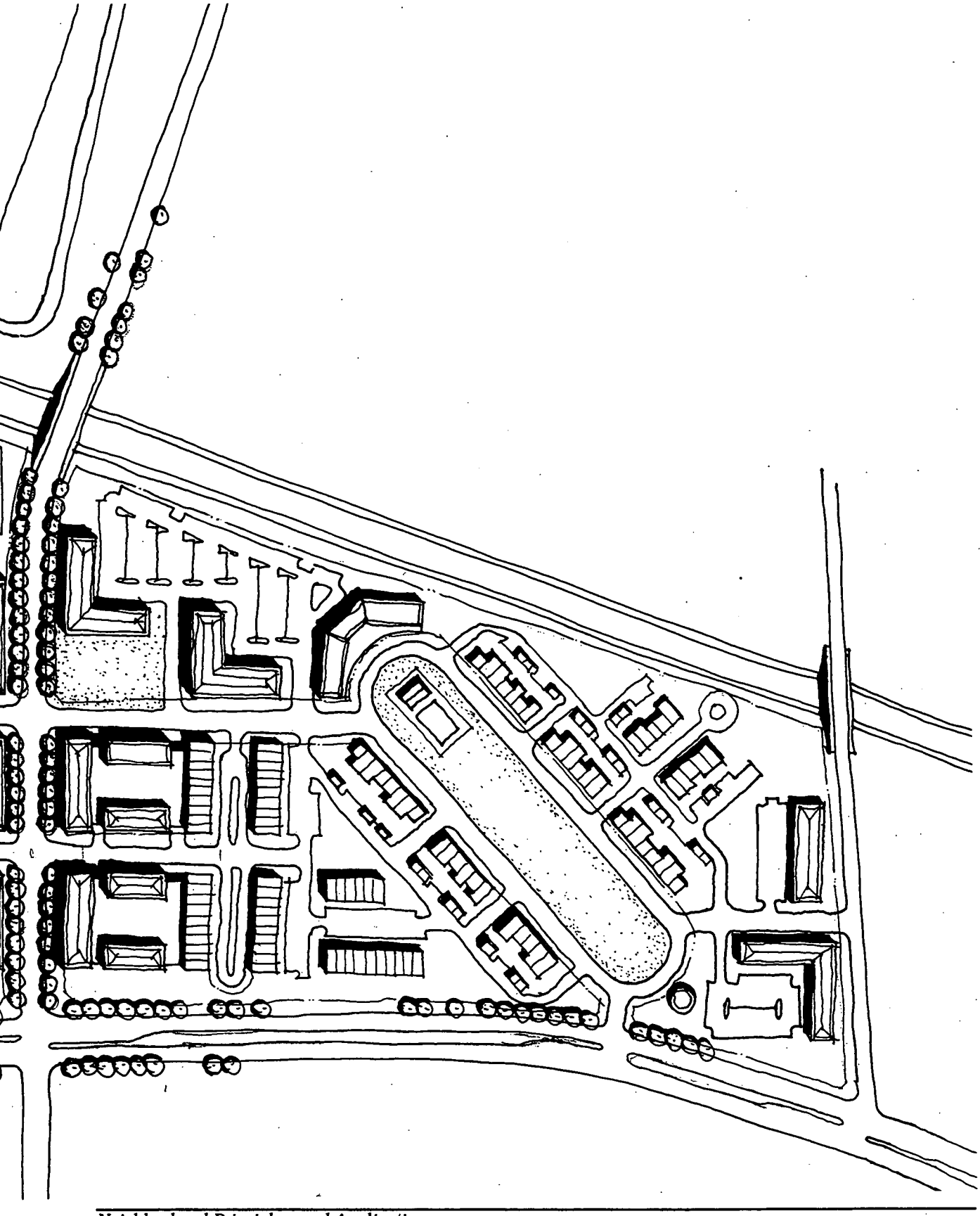
Shady Grove Plan



- Across Redland Road to the east along Main Street, a public square forms the open space for retail uses targeted to the immediate residential neighborhood of mid-rise, walk-up apartments, flats above retail, and townhouses.

- Main Street terminates at a recreation center in a park to the southeast, containing space for large active recreation fields.

e. Use of Identified Neighborhood Design Principles

- Identifiable Center: A large Metro Center Park with light rail along the northwest edge provides a distinctive image for this neighborhood. Regional destinations occurring along the edge of the park include retail services, a cinema/restaurant complex, concentration of office employment, and higher density housing units.

- Mix of Uses: Land uses are integrated throughout the site. In addition to the mix described above, blocks of residential uses on either side of Redland Road contain a mix of multi-family units, single-family attached units, townhouses, and some retail uses.

- Interconnected System of Streets: A grid system is established throughout the Metro Center neighborhood connecting to Redland Road and peripheral roadways.

- Diversity of Housing Types: A wide range of housing types for moderate and higher density urban living life styles are provided throughout the Shady Grove Metro Center neighborhood. County ordinance provisions will require a component of affordable housing that will not likely occur naturally in the market place.

- Mix of Open Space: A large linear public park sets the tone for the image of this Metro station neighborhood. The space can be used for public gatherings, parades, casual strolling, picnic lunches, and informal recreational playfield space. Streets are lined with shade trees. A square provides a focus for the medium density residential enclave southeast of Redland Road. A recreation center is located in the park containing playfield space.

- Street Oriented Buildings and Pedestrian Ways: All buildings front on streets with sidewalks. Special bikeways are provided along the major thoroughfares of MD 355 and Redland Road, within the Metrorail right-of-way, and alongside both sides of the proposed light rail corridor. Secure bicycle storage is provided in the garage adjacent to the Metro station.

- Transit Stops within Walking Distance: All residences located northwest of Redland Road are within a 10-minute walk to the Metro station. Most people in the project area and a few in future development south of MD 355 will be within a 15-minute walk of the Metro station. All people within the neighborhood will be within a 5-minute walk of at least one bus stop.

Clopper Village, Germantown—Example II: Medium Density Neighborhood Along Express Bus and Local Feeder Bus Lines

The future Clopper Village in Germantown provides an opportunity to mix medium density residential uses with a retail center within the boundaries of a transit and pedestrian oriented neighborhood. In addition to Germantown, several opportunities for this form of development, both for new development or redevelopment of existing sites, are available throughout Montgomery County. In accordance with the Germantown Master Plan, the following program was developed:

a. Design Program

Item	Guidelines
Tract area	130 acres
Office uses	20,000 s.f.
Retail uses	150,000 s.f.
Residential mix (du's)	
multi-family (including 75 elderly units)	375
attached	50
detached	150
TOTAL	575 du's
Elementary School	14 acres
Church site	3 acres
Civic space/local park	10 acres
Stream Valley Park	10 acres
Automobile service station	2.4 acres
Child and elderly care facility	4 acres

b. Transit and Pedestrian Facilities

- Express bus line along Great Seneca Highway with stop at retail center. Local feeder bus line along Mateney Road with transit stops.
- Express bus stop and bus transfer station near the intersection of Great Seneca Highway and Mateney Road with three bus bays and a small parking area.
- Bicycle connections from immediate site and beyond.

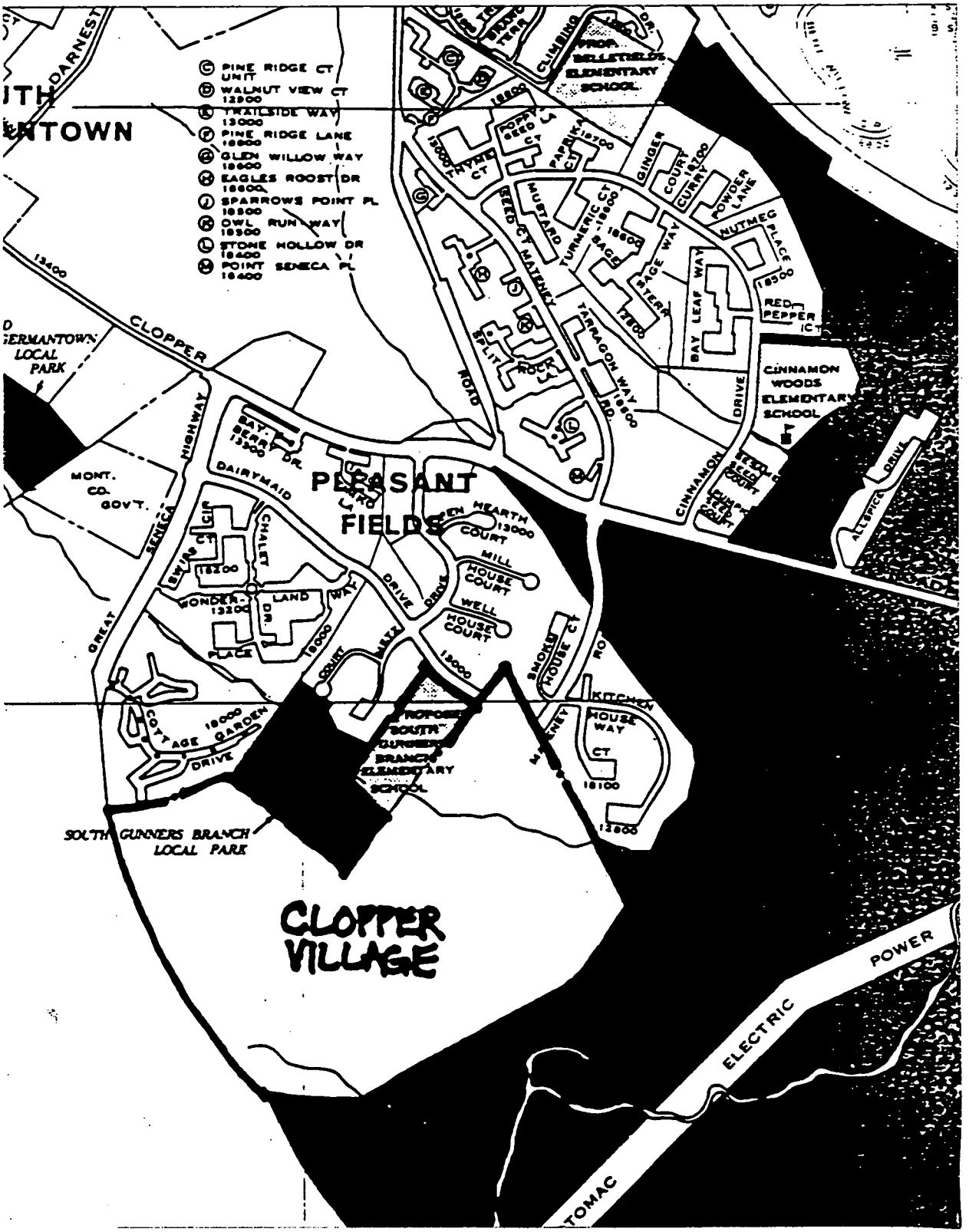
c. Site Factors Shaping Design Direction

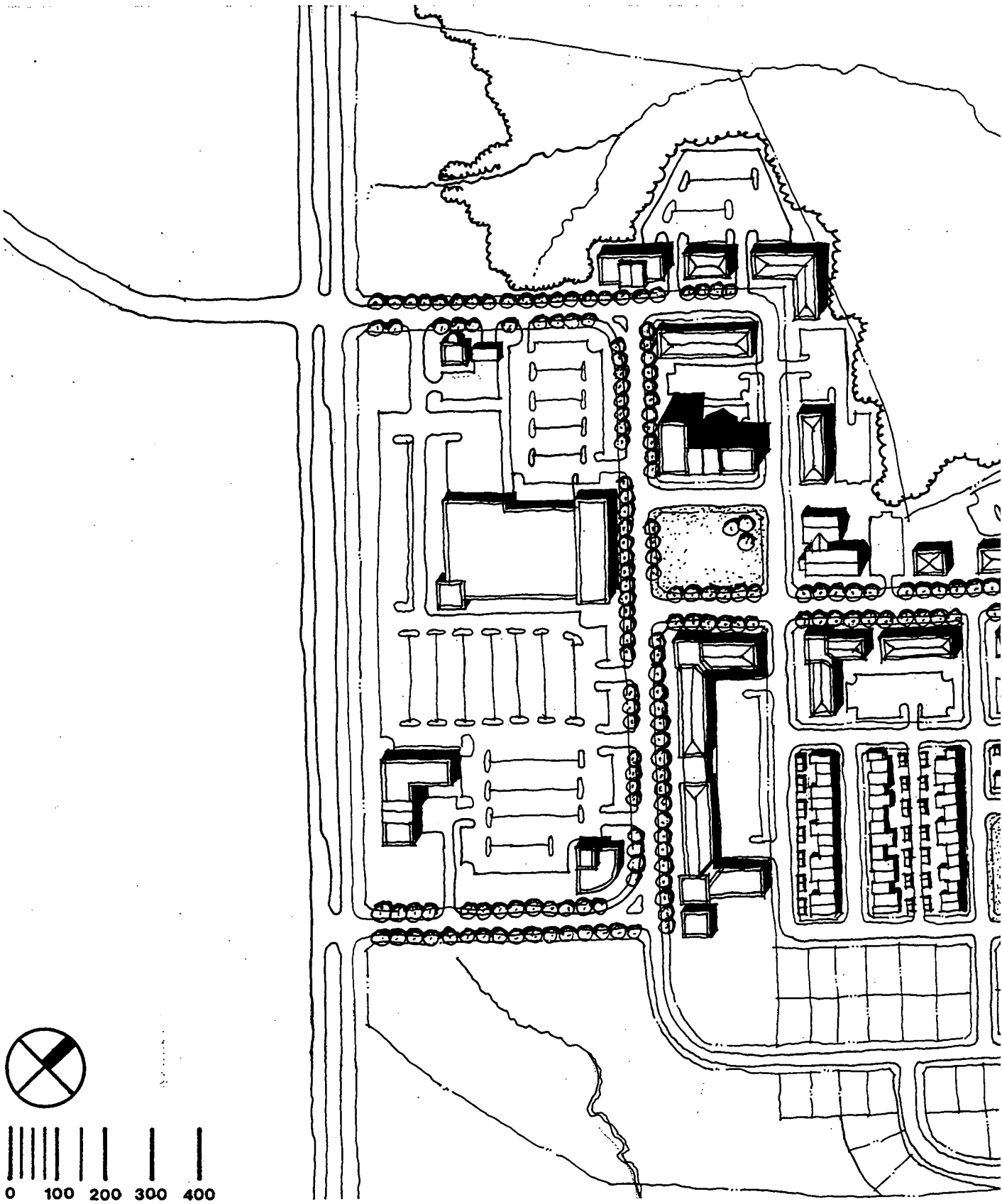
- Village Center commercial uses need visibility and access off Great Seneca Highway.
- Stream valleys border the other two edges of essentially a triangular development parcel after reserving the site for the elementary school designated in the Master Plan.
- An arterial road (Mateney Road) is to penetrate the site providing access from adjacent residential areas to the village center.
- Regional parkland and a local park adjoin the property.
- The express bus along Great Seneca Highway can only be diverted a short distance into the property for one stop, and some convenient commuter parking must be provided.

d. Essence of Design Concept

- A Village Square is formed at the high point of the site as a central focus for the community.
- A mix of uses at the village square creates an identity and generates activity during all hours of the day and evening. Two edges of the square have retail uses, another edge has elderly housing with a senior citizens center, and the square is headed on the remaining frontage by a church.
- The express bus stop and bus transfer station are located opposite the church on the square along retail frontage. Convenient commuter parking is located on the opposite side of the street from one corner of the square.
- The neighborhood retail complex is designed to have shops fronting on a retail street while the grocery store, office building, and automobile service station relate directly to the regional arterial. All uses have visibility from the arterial. Special attention was devoted to the organization of this neighborhood retail complex to demonstrate that the market needs exemplified by a suburban strip center can be satisfied while at the same time incorporating retail uses into a more traditional urban "main street" setting.
- Mateney Road is established as the "main street" coming directly to the village square. Retail, higher density housing, and civic uses including day care, an elementary school, and a church are located along the main street.
- An entire block in the midst of the residential sector is devoted to a recreational park with a swimming pool and open playfield space. Smaller parks in the residential areas provide scattered tot-lot play space.

Clopper Village Location Map

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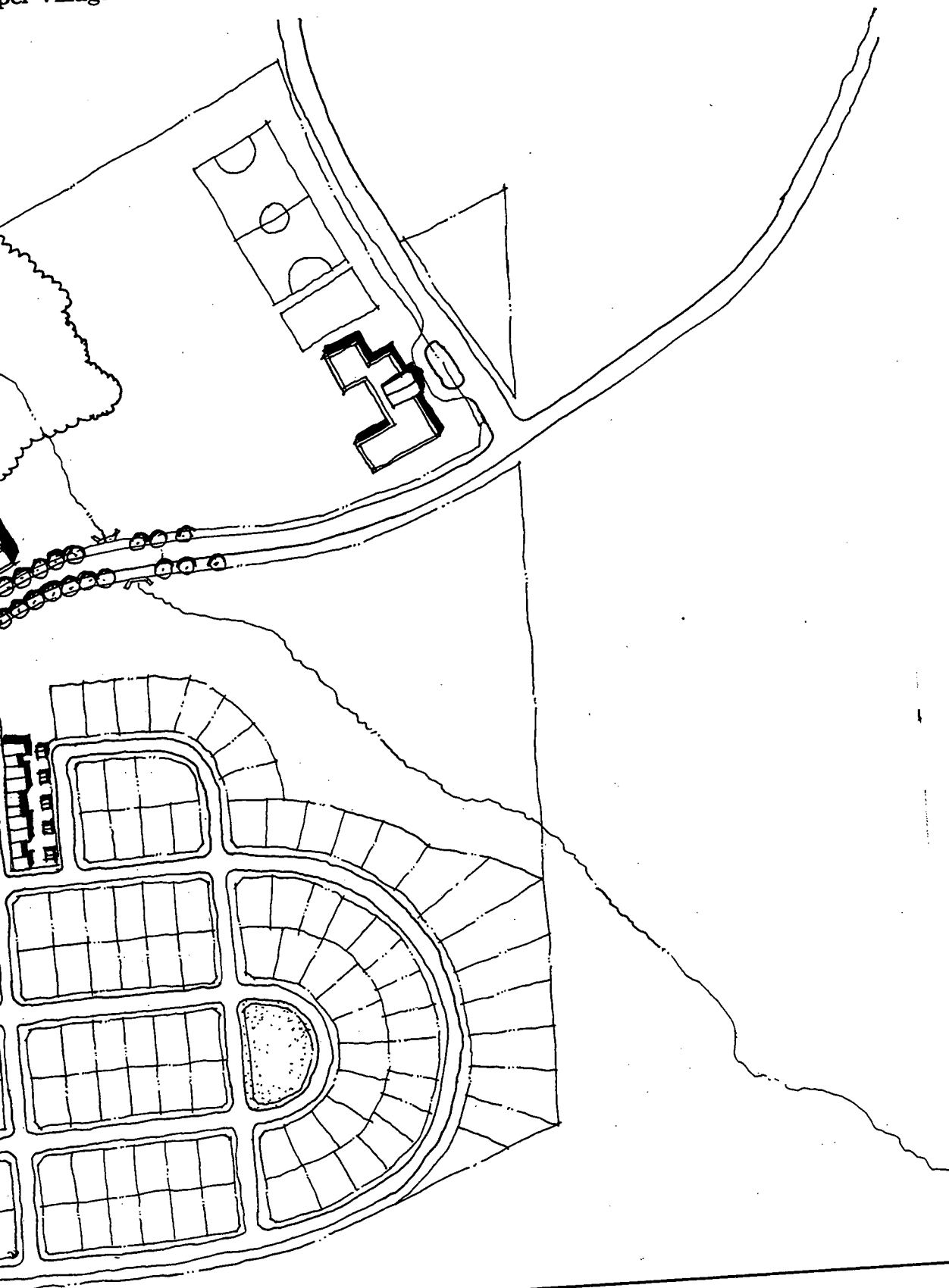


e. Use of Identified Neighborhood Design Principles

- Identifiable Center: A village square surrounded by a mix of retail, civic, and residential uses is established as the central focus for the neighborhood.

- Mix of Uses: Land uses are mixed throughout the village with a finer grain of land use diversity and mix occurring near the village square where, for example, different residential uses occur within the same block and residential flats are located above retail.

- Interconnected System of Streets: A basic grid system is established for the entire village. Some of the streets are curved to conform to topographic features and property boundaries. Mateney Road, after it passes the elementary school on its way to the village square, is sensitively located in a draw as it crosses a stream corridor and ascends to the plateau of the village center.

- Diversity of Housing Types: A full range of housing types for different life styles and income levels are planned within the village structure established for the neighborhood. On some central blocks, multi-family housing, and single-family attached and detached housing occur within the same block. Conformance to County ordinance provisions for affordable housing provides a greater potential variation in the cost of housing than would likely occur naturally in the marketplace.

- Mix of Open Spaces: A village square provides a central civic open space; a park provides active recreation space; smaller park areas provide tot-lot space; preservation of open space along stream corridors, passive open space; and adjacent regional and local parks provide added open space resources.

- Street Oriented Buildings and Pedestrian Ways: All buildings front on streets with sidewalks throughout the village. A combination bicycle and pedestrian way runs alongside Mateney Road and Great Seneca Highway. Secure bicycle storage is provided adjacent to the village square at the park-and-ride commuter lot.

- Transit Stops within Walking Distance: Most dwelling units are within a 10-minute walk of the express bus stop at the village square. All units are within ¼ mile of a bus stop. The bus transfer station at the village square provides easy transfer between local and express buses, plus the opportunity to combine shopping or other trips during transfer.

- Multi-Mode Public Rights-of-Way: Street rights-of-way accommodate pedestrians and bicyclists in addition to automobiles.

Conley Farm, Fairland Neighborhood—Example III: Low Density Neighborhood Along Local Bus Feeder Lines

The Conley Farm in Fairland is located at the intersection of East Randolph Road and Old Columbia Pike. This neighborhood example is intended to represent the range of issues encountered in the review of preliminary plans and site plans. Numerous parcels of land similar to the Conley Farm are concentrated outside the Beltway. The elements in this neighborhood include the following:

a. Design Program

Item	Guidelines
Tract area	90 acres
Retail	1500 s.f.
Residential mix (du's)	
attached	200
detached	200
TOTAL	400 du's
Civic space/local park	10 acres
Stream valley park	10 acres
Community building	—
Child care facility	4 acres

b. Transit Facilities

- Local feeder bus stops along East Randolph Road and Old Columbia Pike at appropriate intervals.
- Bicycle connections to transit, adjacent parcels, and a major "bikeway" along Old Columbia Pike.

c. Site Factors Shaping Design Direction

- The sharply defined stream valley pattern with its steep slopes and with one of the drainage ways extending the entire length of the site.
- A desire to retain the distinctive farmhouse as a community building for the tract.
- Traffic along two major roads that border two edges of the rectangular site forms a busy intersection at one corner of the tract.

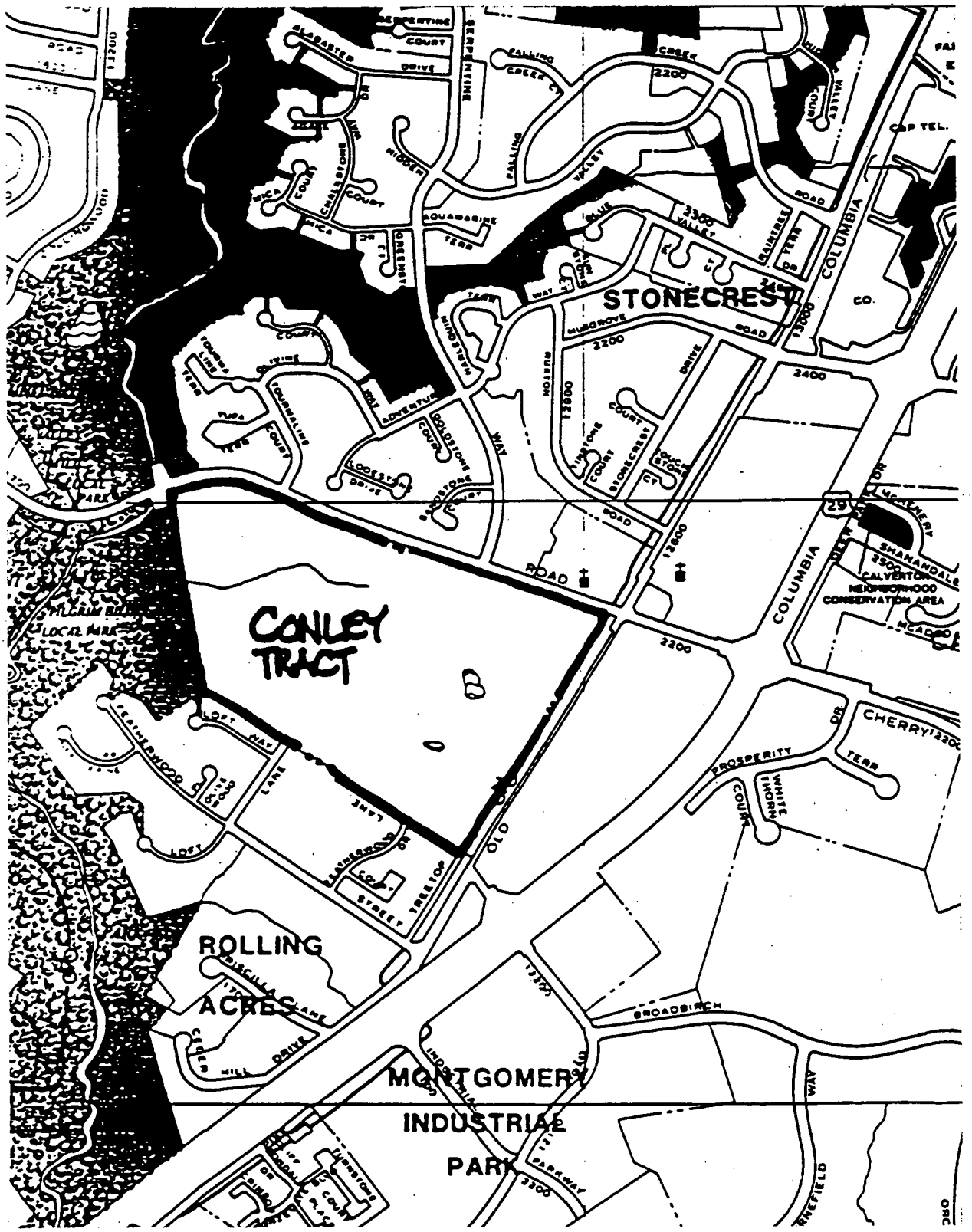
d. Essence of Design Concept

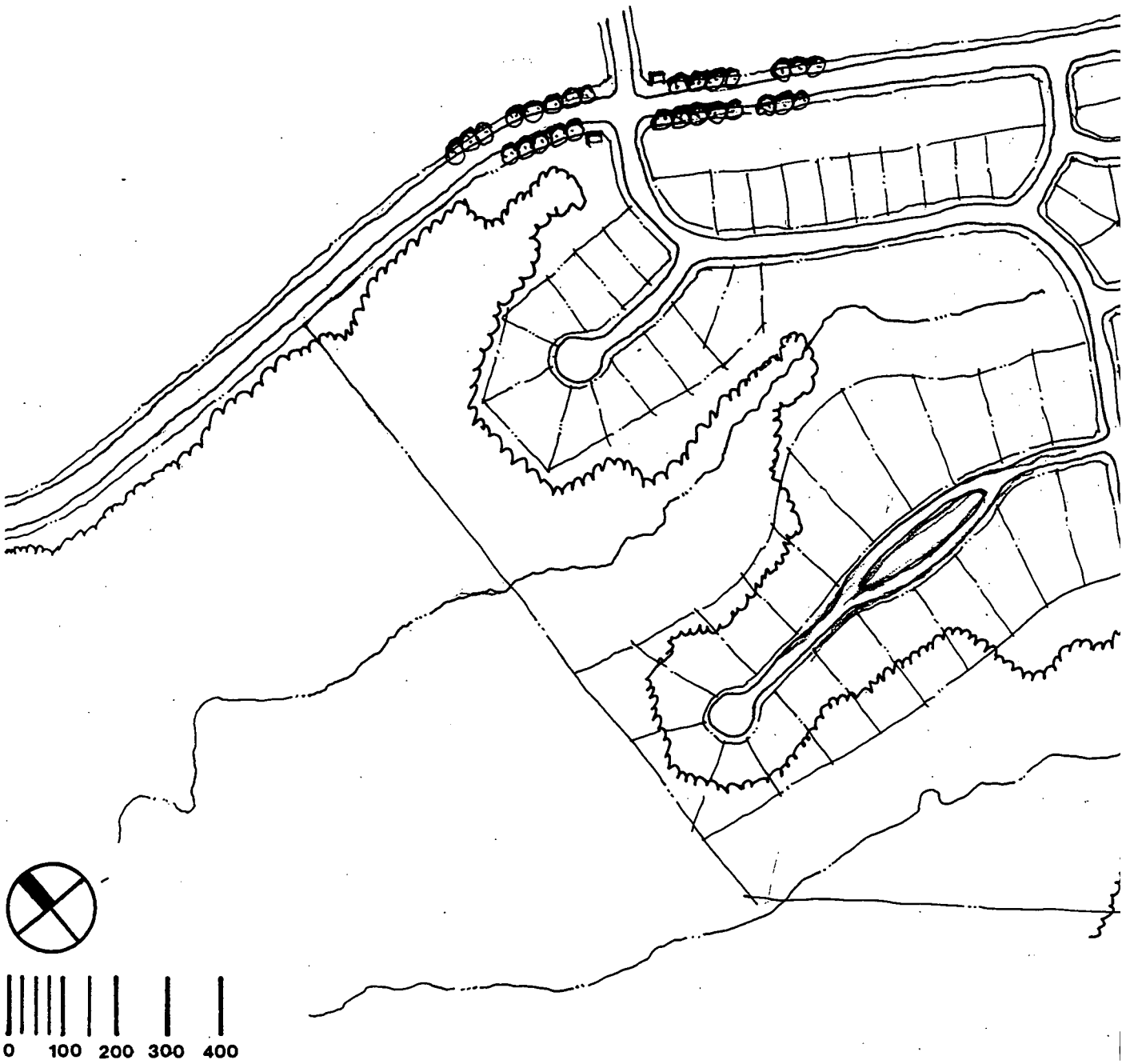
- A central neighborhood focus is established at the farmhouse which becomes the community meeting and recreation center within a park.
- Activities are added to the immediate central area to reinforce a sense of place and increase social contact. They include, in addition to the community center, a daycare facility and a convenience store along the major road.
- Streets with sidewalks lead directly toward the bus stops and central place.
- The highest density of housing, and therefore the greatest number of people, are located in close proximity to the center, providing a short distance for most people to the bus stop.

e. Use of Neighborhood Design Principles

- Identifiable Center: Restored historic farmhouse as the community center and a daycare facility in a public park establish an identity for the tract.
- Mix of Uses: Civic uses, recreation, and a convenience store are provided within residential areas.
- Interconnected System of Streets: A basic grid system is established. Culs-de-sac are used only to reach properties on two peninsulas to avoid environmental damage along steep slopes of the drainage way and to access a few lots along a narrow strip of land bordered by existing development. The road system is laid out to inhibit potential cut-through traffic attempting to avoid the traffic signal at the northeast corner of the tract.
- Diversity of Housing Types: Single-family attached, townhouses, and various sized single-family detached unit lots are provided. The property is zoned for lower density housing with no more than 50 percent attached housing and no multi-family.
- Mix of Open Spaces: Passive open space protects the environmentally sensitive drainage ways, a park provides active recreation opportunities, and landscaped courts provide open space relief within attached housing areas.
- Street Oriented Buildings and Pedestrian Ways: Provided throughout the tract.
- Transit Stops within Walking Distance: Most residents are within a 5-minute walk of the two local bus lines bordering the property. Only 10 percent of the units have slightly greater than a 10-minute walk.
- Multi-Mode Public Rights-of-Way: Street rights-of-way accommodate pedestrians and bicyclists in addition to automobiles.

Conley Farm Location Map

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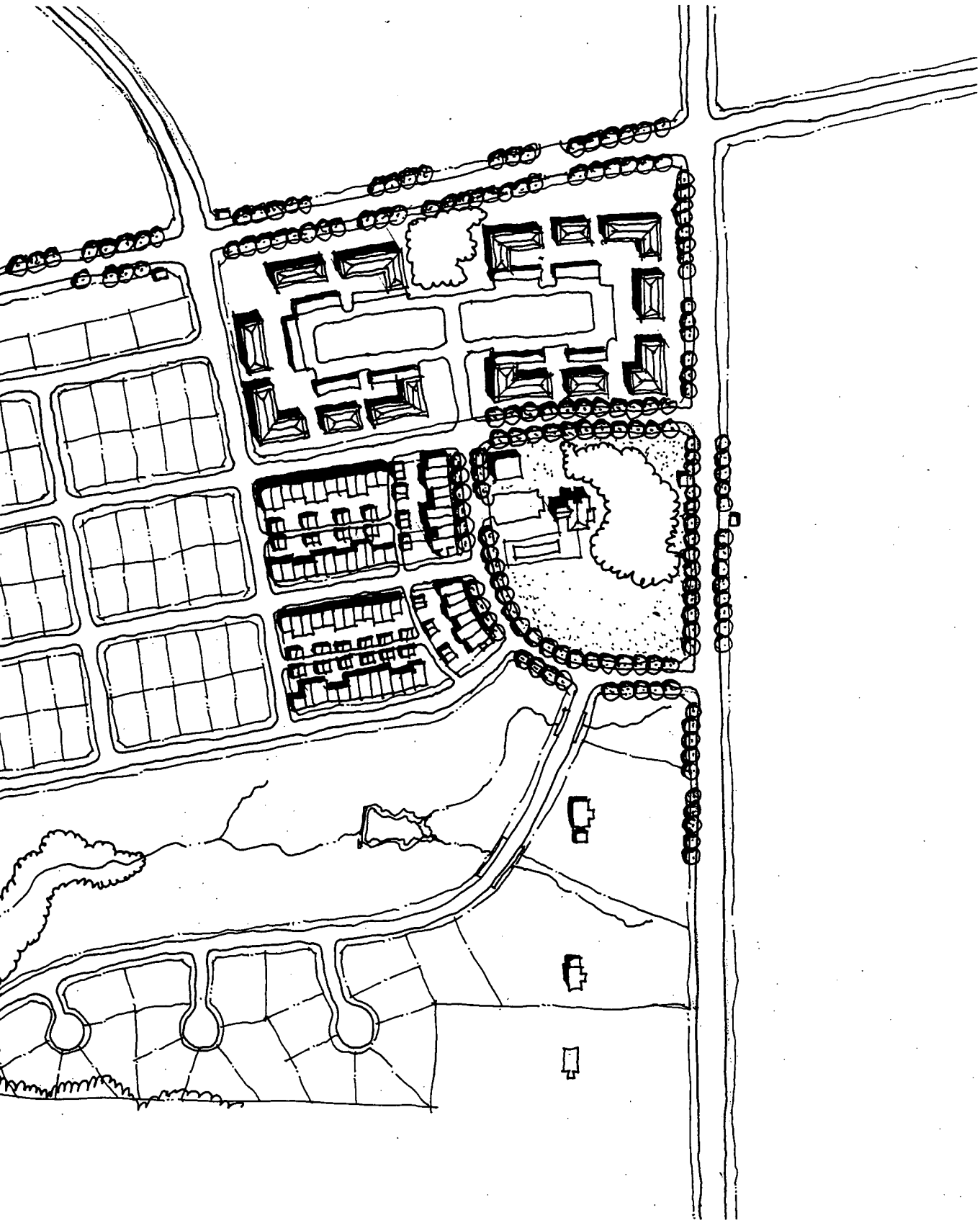
Conley Farm Plan



IMPLEMENTATION

This section of the report identifies a series of modifications to the Zoning Ordinance, Subdivision Regulations, and Road Code necessary to implement the designs of the three neighborhood plans. This section is not intended to be a broad examination of existing regulatory impediments. The modifications necessary to implement the design for Shady Grove Metro Center, the Clopper Village, and the Conley Farm include the following items.

a. Modifications to the Zoning Ordinance

- Reduce building setbacks from public streets to 10 feet or less.
- Adopt a new, small-scale floating commercial zone (i.e., applied through the development plan process).
- Establish a new mixed use neighborhood zone that requires the use of all the neighborhood principles.
- Revise the TSR and TSM zones to reduce open space requirements, permit low rise, high density development, and permit street oriented retail uses.
- Revise the RMX zones to eliminate building setbacks from public streets and permit additional office space.

b. Modifications to the Subdivision Regulations

- Expand options for use of private streets to allow a mix of single-family attached and detached units to be grouped around a community open space with access from private streets.
- Expand options for use of public rights-of-way and coordinate with revisions to the Road Code/Chapter 49.
- Reinforce existing standards for street layout and block design, and all language that promotes an interconnected street layout.
- Revise subdivision language to permit both secondary and tertiary streets to serve residential areas under 200 dwelling units.

c. Modifications to Existing Road Standards

This study does not attempt to examine the entire Road Code. The intent is to identify the modifications necessary to implement appropriate standards for transit and pedestrian oriented neighborhoods such as the Shady Grove Metro Center, Clopper Village, and the Conley Farm.

A series of key elements distinguish the existing road standards in Montgomery County from the road standards found in transit and pedestrian oriented neighborhoods. The following modifications to existing standards would be necessary to distinguish streets in transit and pedestrian oriented neighborhoods from other roads in Montgomery County:

- Narrow intersection spacing (i.e., 150-200 feet) for all streets located within neighborhoods.
- On-street parking should be a key element of all local streets.
- More flexibility in horizontal alignments (i.e., 90 feet diameter for secondary roads).
- Eliminate land use controls based on street classification.
- Reduce turning radii at intersections (i.e., 15 feet on roadways with on-street parking).
- Additional standards that allow a variety of sidewalk and bikeway dimensions based on local conditions.
- Additional use of special design features to customize each neighborhood and improve pedestrian access, such as a variety of traffic circles and intersection "neck downs."
- Permit use of brick sidewalks and crosswalks, special street lighting, and street furniture in areas with high pedestrian volumes.
- Provide additional sections, including at least the following:

  - 4-lane divided with on-street parking both sides
  - 2-lane divided with on-street parking both sides
  - 2-lane with on-street parking both sides
  - 2-lane with on-street parking one side only
  - one-way with on-street parking on one side only
  - narrow width alley.

TRANSIT ACCESS AND NEIGHBORHOOD TRANSPORTATION PLANNING

JHK & Associates
Alexandria, Virginia

THE NEED AND THE BENEFITS

The Past: The Public Transit Era

Traditionally, urban land development patterns have been substantially influenced by the available modes of transportation. Transit was once the primary mode of transportation for most individuals living in U.S. cities. At the beginning of the twentieth century, mobility in large cities was heavily dependent upon streetcars. Shopping streets developed along the streetcar lines. Local shopping centers formed where several street car lines intersected. Housing, to be convenient and marketable, had to be within no more than two or three blocks of the streetcar line. This resulted in land use patterns that had relatively compact development along narrow corridors which emphasized pedestrian movements.

In the suburban areas, commuter railroads and the interurban electric railway lines promoted the outward spread of population. Due to the spacing of commuter rail stations (two to three miles), development occurred as mostly isolated pockets

concentrated around the stations. The interurban, however, had stops much closer together (as short as one-quarter mile). This produced almost continuous, linear patterns of suburban development. Still, the development patterns around both of these modes had a basic characteristic similar to areas around street car lines: the pedestrian orientation to the transit service.

The Present: The Private Auto Era

Recent urban and suburban development has been primarily shaped by the private automobile. It provides a comfortable and convenient mode that eliminates the need to live and work close to a transit facility. Thus, development occurred between commuter rail stations and spread out from interurban and streetcar lines. The jingle recently used by one major American auto maker - "It's not just your car, it's your freedom" - succinctly illustrates the mind set which has come to be associated with the automobile.

The provision of high speed highways and expressways permitted unprecedented mobility. Residential and commercial development could be marketed on relatively inexpensive, formerly remote land. Across the country this has resulted in the sprawling development typical of most suburban areas. In Montgomery County, the recent Comprehensive Growth Policy Study observed that, in general, the General Plan on Wedges and Corridors has been followed at the macro scale. At the micro- or neighborhood scale, however, provisions for walking, bicycling, and transit, in many cases, have been improved. The main objective of most residential street layouts was to restrict movements of through-traffic through curvilinear street alignments.

The results are density patterns and street layouts that are effective in reducing unwanted through traffic from local residential streets but have the consequence of being difficult to serve cost effectively with bus service. The critical need is for reasonable walking distances to the transit stops. To try and achieve this, buses must often be routed on circuitous paths through low density neighborhoods along streets not necessarily designed to accommodate buses. Walking and bicycling routes are often long, indirect, and along streets that have not been oriented to those movements. A street layout that requires an extra half-mile of travel is inconsequential to the driver but a substantial impediment to the pedestrian.

THE CHALLENGE

The auto will continue to be the dominant mode for the foreseeable future. But this does not mean that suburban land use should cater to the auto only; pedestrian, bicycle, and transit linkages need to be better incorporated into the planning and design process. We have entered a new era in which the interdependence between land use planning provision of transportation services receives more emphasis than it has in the past.

The Comprehensive Growth Policy Study recognized this when it studied some of the ways that transit, bicycle, and pedestrian oriented design principles can be incorporated into the subdivision and site plan review process. This does not require a total revision to the process. In many cases, it simply means remembering that the pedestrians, bicycles, and buses are there and reflecting that fact in the way communities and

transportation systems are built. The benefits of coordinated land use, transit, pedestrian and bicycle planning are many. Efficient transit service can be provided.

PRINCIPLES

A transit, pedestrian, and bicycle oriented development does not have to be limited to one specific arrangement of land uses. Rather, from a transportation perspective, it can be defined by the following characteristics.

Development Characteristics

a. efficient and direct movement of buses,

b. adequate transit ridership to support relatively frequent service,

c. accessibility to the transit service and local destinations by walking and bicycling along safe, convenient, and pleasant paths,

d. a recognition of the interrelationships between uses to maximize pedestrian access,

e. street widths and geometry that improve pedestrian accessibility within neighborhoods,

f. a separation of pedestrians and bicycles from traffic flows on major highways and arterial roads, and

g. short, safe crossings of major highways and arterial roads where required.

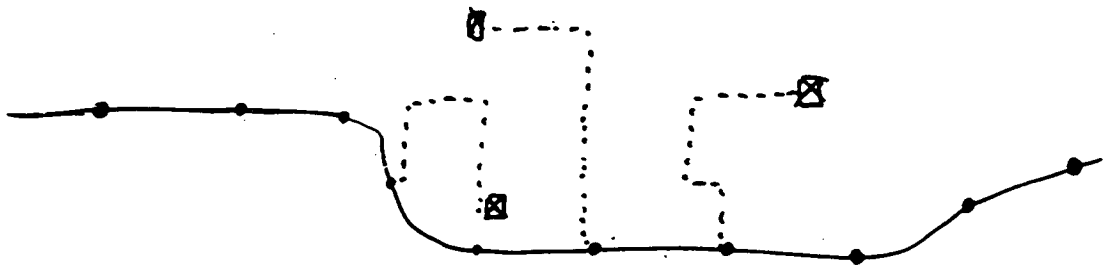
For purposes of this paper, transit oriented areas can be conceived of as two types, as shown on the following page: 1) along bus routes, and 2) at the transit nodes. The transit oriented area along bus routes would typically be along local or feeder routes. For these areas, the key element is the pedestrian accessibility to the bus stops. The direct and efficient routing of the bus along the street and roadway network is also important.

For the transit node, several key elements come into play. Pedestrian access is important in the area immediately surrounding the transit center and to the individual bus routes. But walking can only serve shorter distance trips; thus, the amount of walk access to the center is largely determined by the density of development in the vicinity of the center. To provide for the larger service area, the accessibility of the buses to the transit center becomes vital. In addition, bicycle trips can also cover greater distances and require emphasis.

With this as an introduction, the following discussion identifies the land use and transportation planning related principles that should be followed to achieve transit, pedestrian, and bicycle oriented development. This discussion is from a transportation perspective, which is framed in the reality that the automobile is, and will be, the dominant mode of travel in suburbia. The principles identified herein are simply intended

Two Types of Transit Oriented Areas

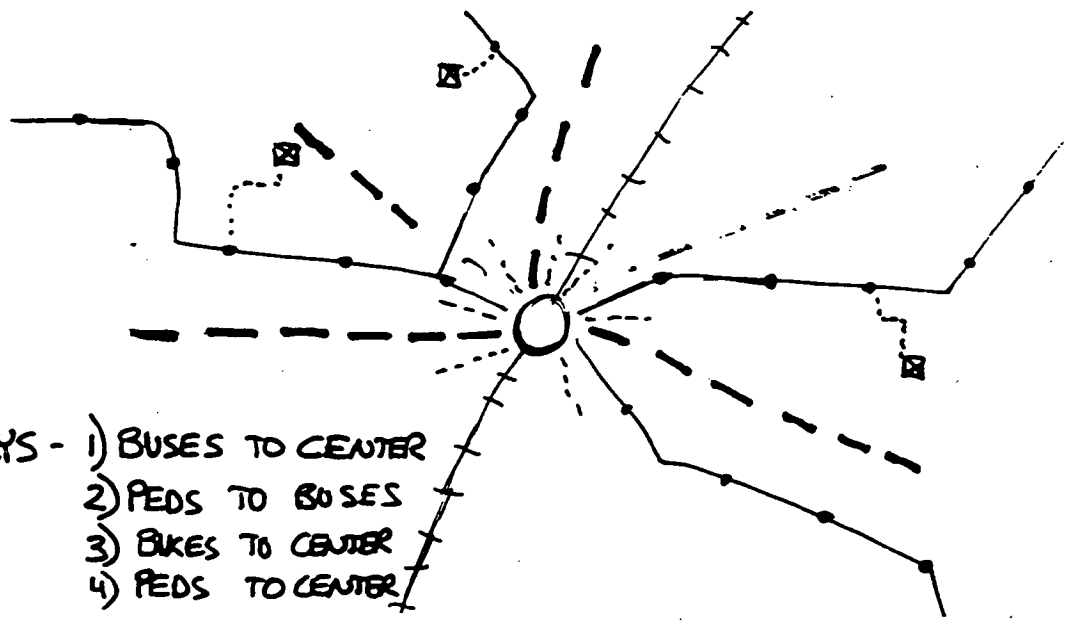
BUS ROUTES



KEY: PEDESTRIANS TO BUS STOPS

TRANSIT CENTERS

— BUS
— — BIKE
--- PED



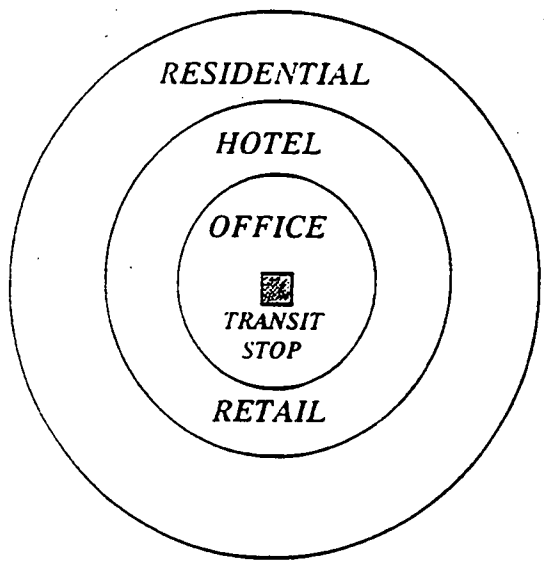
to ensure that the auto is not the only mode in suburbia. The section begins with a discussion of land use arrangements and densities, then presents principles related to roadway and transit network configurations. Following a discussion of pedestrian and bicycle planning principles, appropriate design parameters are presented.

Land Use Principles

As noted previously, the arrangement of land uses does not have to be pre-defined; the key item is recognizing the trip-making interrelationships between the land uses and the transit service. For example, restaurants, hotels, and banks have the highest degree of interaction with places of employment. To the extent possible, uses should be clustered together and oriented to the street (and therefore the sidewalks) rather than to parking lots to minimize pedestrian walking distances. In general, the origins and destinations of the potential pedestrian patrons should be identified early in the planning and design process. By orienting the parking and traffic circulation scheme around the pedestrian linkage(s), effective pedestrian pathways will be provided. Pedestrian connections must be direct or they will not be used.

The following diagram represents a general concept for development at a transit node. This is based on data collected as part of development-related ridership surveys at Washington, D.C. area Metrorail stations. Office uses and associated convenience retail should be located closest to the station entrances since they are the most sensitive to distance from the station. The data indicates that people are willing to walk further from their residence to a transit station than between a transit station and an office building. The highest development densities would be located closer to the station. This has the effect of placing more people within a short walk of the station entrances and maximizing transit ridership.

General Concept for Development at a Transit Node



While the density of development is important in terms of creating a compact area, it also is important in terms of generating sufficient transit ridership to support convenient service. Pushkarev and Zupan provided some of the baseline data continually referred to in the literature on this subject. Their data showed that residential densities in the range of between 2 and 7 units per net acre produced only marginal use of public transit. Densities between 7 and 30 units per net acre produced significant transit ridership (5 to 40 percent mode shares). Their research also indicated that net densities of at least 7 units per acre were necessary to justify service with 30-minute headways.

The threshold of 7 units per net acre for residential development seems to be accepted. Seattle Metro uses it as an indicator of minimum residential density supporting transit service. Sacramento County, as part of its newly developed "Transit Oriented Development" (TOD) guidelines, has adopted density ranges between 7 and 30 (average of 12) dwelling units per net acre for neighborhood TOD's and between 7 and 50 (average of 15) dwelling units per net acre for urban TOD's. The TOD's are located within one-quarter mile of a trunk line transit stop. In the secondary area (within one mile of the transit stop) a density average of at least 6 units per net acre is required. In the discussion of densities, the Sacramento guidelines refer to research which shows that transit systems need a minimum residential density of 12 units per net acre to support "frequent and convenient service."

Thus, residential density is a key factor in generating the ridership needed to support transit service. The actual required density in an area is a function of the desired frequency of service and transit mode share. But density is not the only factor. The location of the residential area must be considered with respect to the locations of employment. The Seattle Metro report noted that for high transit mode splits to occur, pockets of high residential density need to be located reasonably close and geographically aligned to areas of high employment density. For employment density, less research is available. Seattle Metro suggests transit ridership increases significantly when employment density exceeds 50 employees per acre for activity centers with more than 10,000 jobs. The Sacramento TOD's require FAR's between 0.35 and 0.60 (approximately 50 to 85 employees per acre) if structured parking is not provided.

Roadway Network

The roadway network not only defines vehicle paths but also defines the majority of the pedestrian and bicycle network and all of the transit network. For areas to successfully accommodate the users other than the auto, the needs of the pedestrians, bicyclists and transit vehicles must be considered.

a. Functional Classification

In servicing autos, roadways have two basic functions: to provide vehicular movement and to provide access to properties. To effectively serve suburban development, a roadway system must have a hierarchical organization. The higher roadway classifications emphasize vehicle movement - the highest volumes of traffic making the longest distance trips. The lower classifications provide access to the local areas. For pedestrian

oriented areas, the heavy vehicular flows must be separated from the pedestrian paths. The functional classification system provides a framework to achieve this goal. The functional classifications used in Montgomery County are listed below.

- Major Highway
- Arterial Highway
- Primary Residential
- Secondary Residential
- Tertiary Residential
- Alley

The highest classification, the Major Highway, carries line haul buses and serves as a barrier for pedestrian and bicycle crossings. Arterial highways carry moderate to heavy traffic volumes, local and feeder buses (with greater stop spacing), and can have pedestrian and bicycle facilities, preferably physically separated from the roadway. The primary residential street is the lowest classification which should carry buses.

b. Street Widths

For streets within the neighborhood, the street width, configuration, and traffic speeds are primary factors in the degree of pedestrian orientation. Wide, straight streets with long blocks encourage high speeds. A more livable neighborhood can be achieved through the use of design criteria that provide a better pedestrian environment. Historically, widths were linked to considerations of convenience for the largest vehicles that might use the street. Such design approaches are appropriate for arterial streets but are difficult to justify for residential streets. The pedestrian orientation can be enhanced by using the minimum street width which will meet all realistic needs. Thus, primary residential streets should be wider (two moving lanes and two parking lanes) than secondary streets. The newly published Second Edition of Residential Streets suggests the following guidelines:

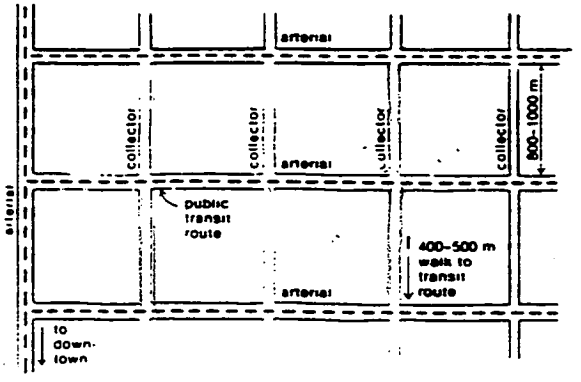
- Collector (primary residential) - 36 feet (two moving lanes and two parking lanes)
- Subcollector (secondary residential) - 26 feet (one moving lane and two parking lanes; if on-street parking lines both sides of the street continuously, a 28-foot pavement may be preferable)
- Access (tertiary residential) - 22 to 24 feet (one moving lane and two narrower parking lanes)

These streets can accommodate most snow operations. For primary residential streets with continuous parking along a bus route, an additional two to four feet in width would be desirable for safe bus operations.

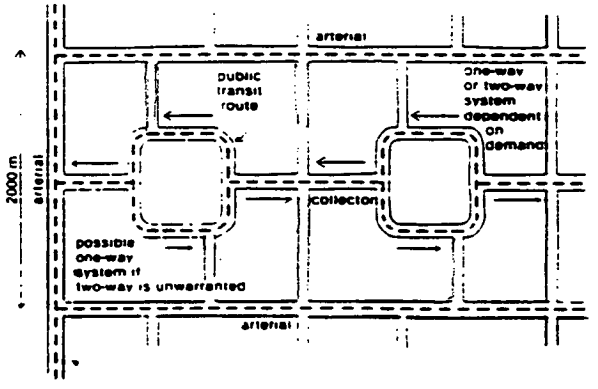
c. Street Layouts

As noted, the street layout affects the transit bus routing and pedestrian access. Thus, it is essential to specifically consider the requirements for transit service, pedestrians, and bicycles. Many of the recent efforts to discourage through traffic within neighborhoods has resulted in street layouts which are difficult and inefficient to serve with transit. Effective transit service can only be provided if routes can be developed that are relatively direct. For locations in which cut-through traffic might use the direct routes through the neighborhoods, bus-only connectors could be used. Simple signing and occasional enforcement could probably be used if required. For transit nodes, the street layout should provide some orientation to the transit station/center. While a grid system indirectly provides this, some limited use of radial streets increases the direct accessibility. Care must be used, however, not to focus heavy traffic volumes on a single point or create unusual and unsafe intersections. The diagram on the following page delineates modified street patterns to facilitate transit access to subdivisions.

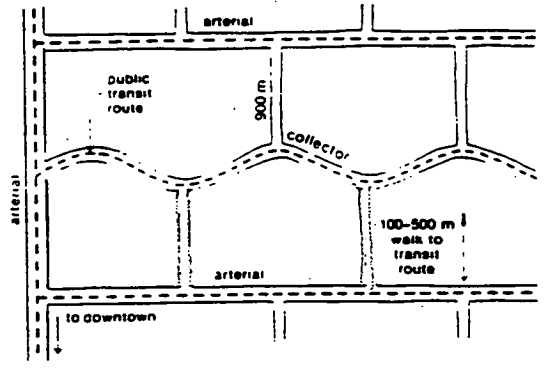
Modified Street Patterns to Facilitate Transit Access to Subdivisions



OLDER SUBURBS WITH PUBLIC TRANSIT ON ARTERIAL



NEW SUBDIVISION WITH PUBLIC TRANSIT ON ARTERIAL AND INTERVENING COLLECTORS

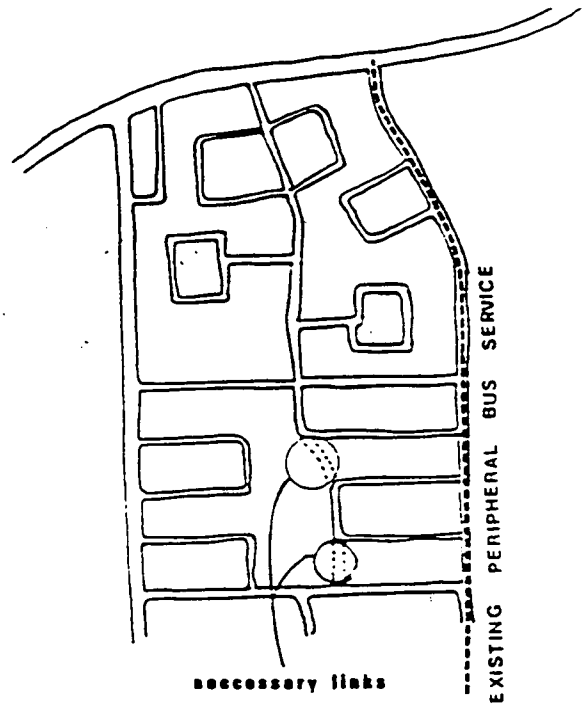


NEW SUBDIVISION WITH PUBLIC TRANSIT ON ARTERIALS AND COLLECTORS

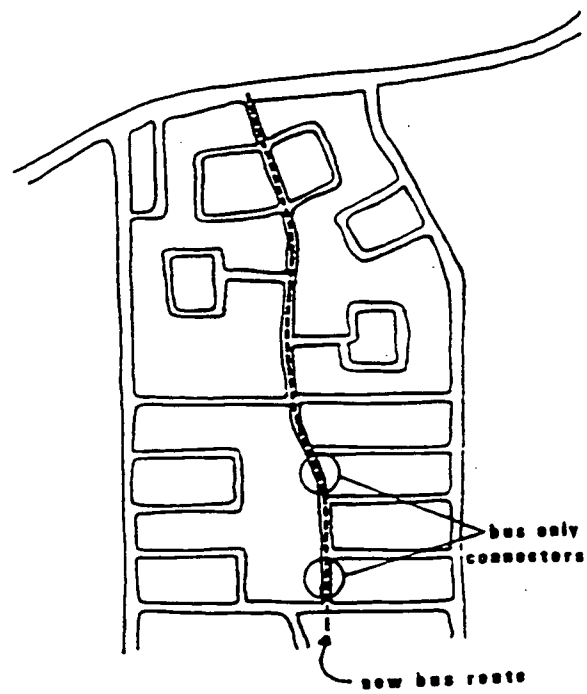
Source: Hallett, P.H., **Canadian Urban Transit at a Glance** (Ottawa: Canada Mortgage and Housing Corp., June 1981).

Use of Bus-Only Connectors to Facilitate Transit Access to Subdivisions

PROPOSED DESIGN - Limits transit service to peripheral arterial roads. Walking distance to bus route is excessive for some residents.



REVISED DESIGN - Use of bus-only connectors provides through routing for transit vehicles and brings service to within several hundred feet of all residents.



Source: Miller, L.E., Community Planning for Public Transit (Victoria: B.C. Ministry of Municipal Affairs and Housing, Transit Services Div., May 1976).

Pedestrian and Bicycle Access

a. Pedestrian Access

The basic key element for a successful transit oriented area is to maximize the number of people within a reasonable walking distance of the transit service. While the general straight line distance to the transit line can be used as a preliminary planning tool, the actual walking distance to the transit stop should be used as a performance measure during site design. Due to the walking paths followed, there can be significant differences.

The Canadian Transit Handbook lists walking distance guidelines and standards for selected Canadian and European cities that are generally in the range of 1,000 to 1,300 feet, or a 5-minute walk. The Handbook recommends, as a minimum benchmark, a standard (using walking contours) of a minimum of 40 percent beyond 1,320 feet. This would require knowing the expected transit routing and the bus stop locations. The local transit agency or qualified transportation planning staff in the Planning Department would need to be involved in the site plan review process to at least provide this input. In Calgary, Alberta, the transit routes and stops are predetermined. In fact, the developer is required to provide items such as the bus stop pads, even if the bus service will not begin for several years after construction is complete.

The street system layout should consider the pedestrian access to the bus stops. For example, the following page shows how minor modifications to the street layout can enhance the pedestrian accessibility. Almost as important as the actual walking distance is the perceived directness of the path as shown.

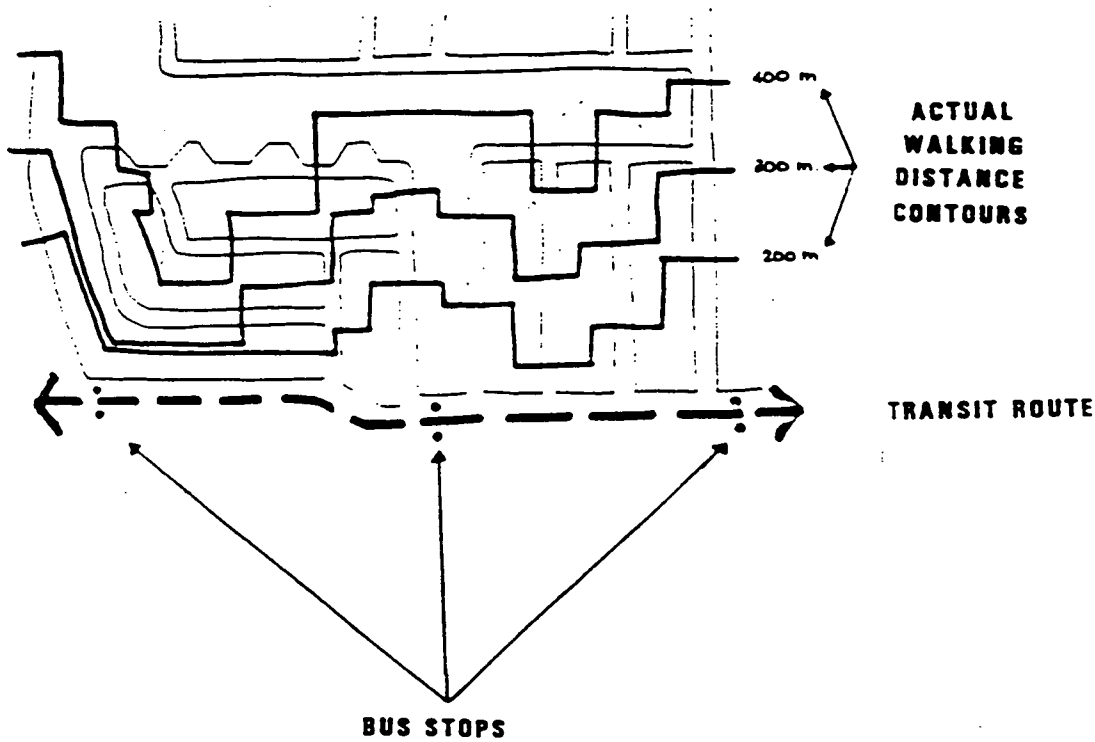
b. Pedestrian and Bicycle Facilities

In a pedestrian oriented area, sidewalks are a key element. Current MCDOT regulations require sidewalks on both sides of all residential streets, except on one side of tertiary streets longer than 300 feet. In general, this seems to be reasonable, but the density of the development should be considered either by not allowing tertiary streets in higher density areas or requiring walkways on both sides.

An internal pathway system oriented to the rear of residences is a desirable amenity for recreation. However, a separated system does not eliminate the need for sidewalks on the street right-of-way. Generally, this system is inadequate to serve other than recreational trips unless it uses the most direct route between magnets. Even so, the lack of visibility presents real and perceived security problems. Previous experiences in areas such as Columbia, Maryland; Reston, Virginia; Chesterbrook, Pennsylvania; and Fremont, California has shown this to be true. This does not mean that all non-right-of--way paths should be discarded. Provisions for resident recreation is still desirable. More important to a transit oriented area is the provision of pedestrian connections through the middle of long blocks and at the end of culs-de-sac. Usually, extra room can be provided between the homes, and occasionally it can be provided in conjunction with a drainage or utility easement.

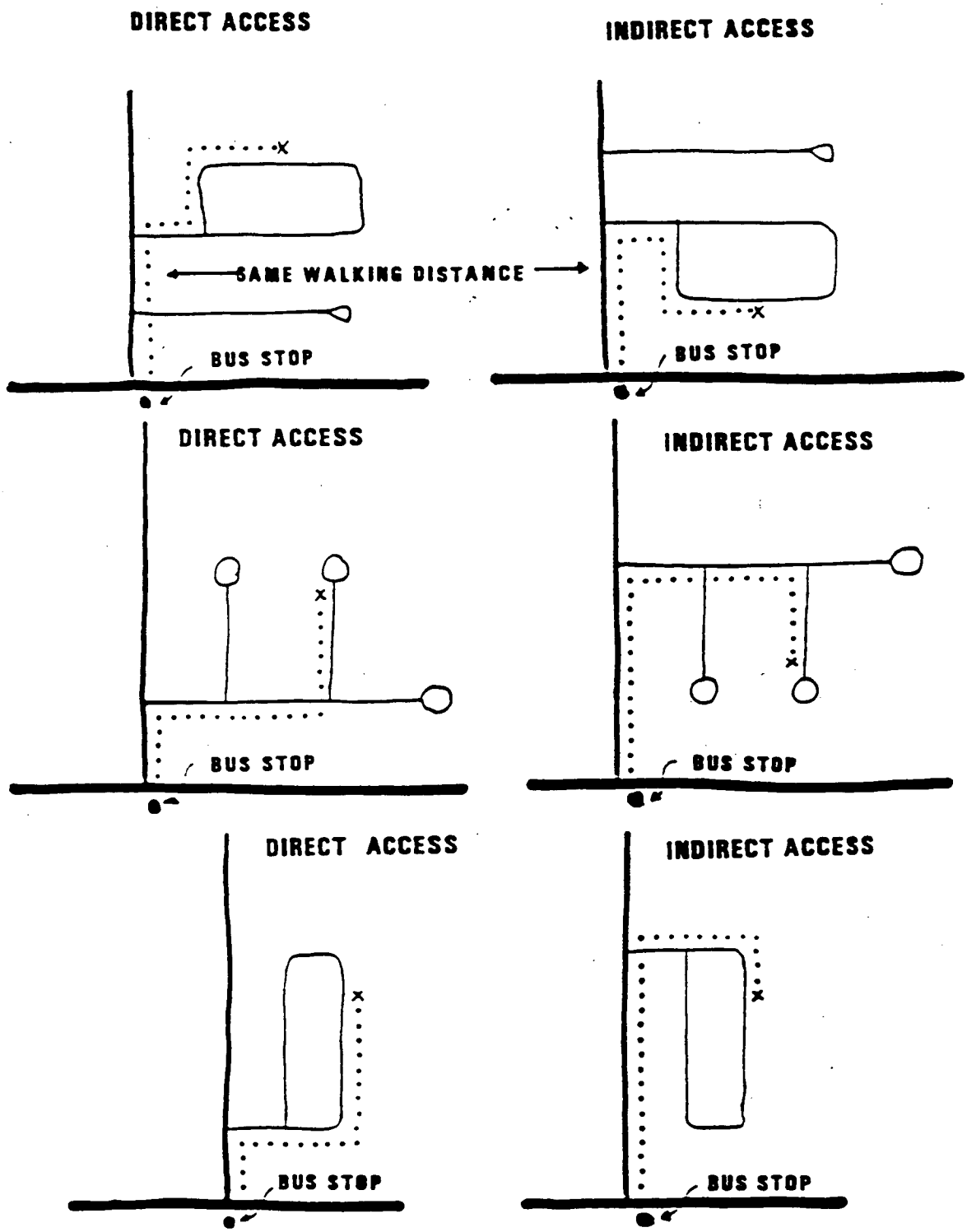
Bicycle access, particularly to transit nodes, should be considered in the design of the development. Where possible, separated pathways should be provided. Along the key access routes, a bike lane or simply wider (13 feet) traffic lanes should be provided. Critical to the success of the bicycle mode is the presence of secure, preferably weather protected, storage facilities at the transit node.

Use of Walking Distance Contours



Source: Lavalin Inc., **Subdivision Design Guidelines to Facilitate Transit Services** (Ottawa: Ministry of State for Urban Affairs, March 1979).

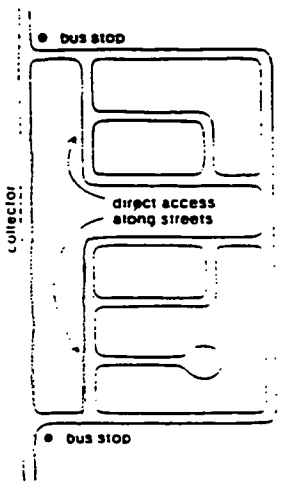
Perceived Directness of Pedestrian Access



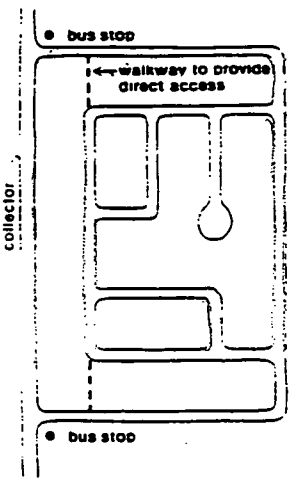
Source: Lavalin Inc., **Subdivision Design Guidelines to Facilitate Transit Services** (Ottawa: Ministry of State for Urban Affairs, March 1979).

Design Techniques to Facilitate Pedestrian Access to Transit Stops

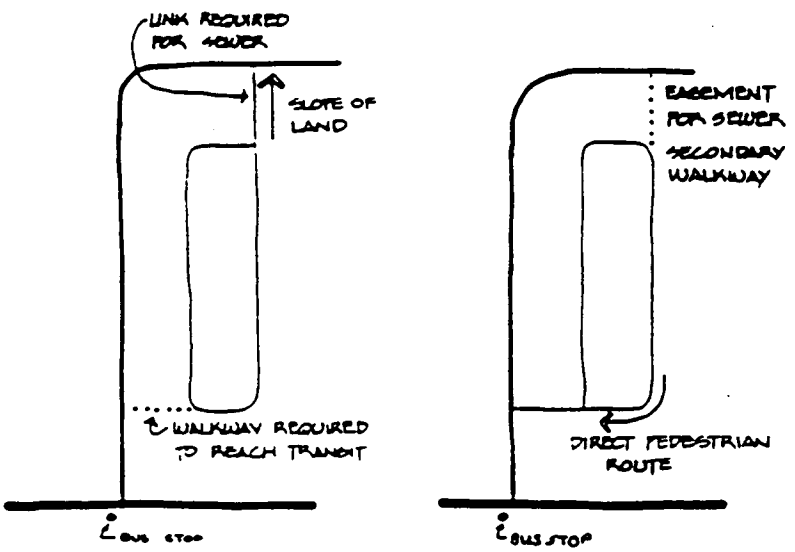
a) Modified Street Layouts



b) Provision of Walkways



c) Street Layouts Modified due to Slope of the Land



Source: Lavalin Inc., **Subdivision Design Guidelines to Facilitate Transit Services** (Ottawa: Ministry of State for Urban Affairs, March 1979).
Hallett, P.H., **Canadian Urban Transit at a Glance** (Ottawa: Canada Mortgage and Housing Corp., June 1981).

A Discussion of Street Geometry and Design Criteria for "Traditional Neighborhood Development"

Chester E. Chellman, P.E.
White Mountain Survey Co., Inc.
Ossipee, New Hampshire

INTRODUCTION

America is rapidly changing. Following the perfection of the mass-production of automobiles early in this century, America's increasing desire for motorized travel, initially thwarted by the First World War, then by the Great Depression, could only first begin to be realized after World War II. In part due to this pent-up desire, Americans after World War II turned to the road. This proclivity was encouraged by the availability of inexpensive fuels, large-scale automobile manufacturing plants, and the newly proposed Interstate Highway System. Subsequent decades of relative prosperity and growth have created ever-increasing needs for housing, jobs, and shopping and service areas. These needs have also created the perceived need for more cars and roads. The magnitude of the American commitment to the road is stunning: in 1986 more than 159 million licensed drivers in the United States were driving 176 million registered motor vehicles over 3.9 million miles of public roads.

Americans have scattered throughout their land. Early zoning regulations, first widely promoted in this country by the Standard State Zoning Enabling Act of 1924, had, as one central theme, the "desirability" of placing great physical separation between work and

home. Beginning with the logical notion that a single-family residence does not belong in the midst of a smoky, noisy, and dirty factory district, this concept was extrapolated to segregate all businesses from all residences. This concept of separating land uses matched wonderfully with the American penchant to drive. Today, due to the years of application of these regulations, it is normal for places of living, working, shopping, and recreating to be considerable distances apart, even when located within the same community. One effect of this type of planning and development is that residents must become accustomed to the necessity of driving everywhere and the concept, or even the possibility of walking to work, for example, has generally become not just unusual, but unthinkable.

Americans are changing. In 1980 approximately 11 percent of North Americans were 65 or older; by the year 2025, this figure is expected to double to more than 22 percent of the population. Proportionally, the elderly suffer more vehicular fatalities than do those aged 25-64, and the fatality rate of the elderly is, to a large extent, determined by their sociocultural situation in society and by the overall road safety consciousness of society. While the elderly show the ability, for safety reasons, to be adaptive in their driving patterns (giving up night driving and driving in bad weather, for example), it seems logical to consider a change in development patterns that can help minimize their dependence on motor vehicles. Indeed, minimizing the need for motor vehicles without diminishing the quality of life could prove beneficial to all.

Some of the design aspects of an alternative style of development are discussed herein. This alternative style of development involves the mixing of land uses and the creation of a pedestrian scale neighborhood, mixed with slow-speed vehicular travel along the style and tradition of many American towns developed prior to 1940. This form of development (traditional neighborhood development) necessitates a reconsideration of many engineering design criteria, which in many cases focus on the needs, sometimes only the perceived needs, of motor vehicles. The focus on the automobile and lack of focus on the pedestrian is, in part, due to a lack of data. The 1960 Highway Engineering Handbook, a recognized reference work of 1,555 pages, devoted only ¼ page to the pedestrian.

What is presented for design consideration is a community within which pedestrian travel is to become a truly viable alternative to the car for some travelers. The design challenge is to integrate the pedestrian and the vehicle in a balanced and safe fashion.

DESIGN CONCEPTS

Traffic engineering accepts as a basic premise that vehicles should travel smoothly and regularly, either without interruption or with interruption only at fixed elements such as traffic signals and stop signs. Highways and intersections are graded qualitatively by their "levels of service," which are directly related to capacity and lack of unscheduled interruption. New designs and improvements generally seek to achieve the highest practical levels of service. However, in those instances where pedestrians and vehicles are to be mixed and pedestrian travel encouraged, it may be necessary to design for, in essence, lower levels of service, at least by current definitions. As an example, a majority of residential streets in Seattle accommodated two-way travel and two-sided, on-street

parking within a 25-foot curb-to-curb dimension. With only 11 feet available for two-way travel, oncoming vehicles are forced to slow, and one to pull over, for the vehicles to pass. While this may be an extreme example of a low level of service, or a deviation from generally accepted design standards, the Seattle streets serve the purpose of slowing traffic and, in this instance, of discouraging through travel. This Seattle example also introduces the important concept that in some instances vehicles must actually make unscheduled stops when traveling on some roads.

Motor Vehicle Data

Cars near people cannot travel at high speed. Many factors affect vehicular speed, but generally wider, superelevated (banked), gently curving, and flat roadways will create higher vehicular speeds than will the unbanked, narrow, angular or hilly streets. Drivers travel along streets based on the physical limitations of the street, not its posted limit. Other design factors can reduce vehicular speed, such as on-street parking, variations in roadway surfaces, and the turning centerline radius. These factors are some of the tools that can be utilized by engineers and planners to design roadways that encourage lower vehicular travel speeds. It is obvious that slower moving vehicles create a safer environment and help to encourage pedestrian travel.

Travel speeds also dramatically affect motor vehicle stopping distances. At 20 miles per hour, a passenger car on wet pavement can generally stop in 107 feet, following the sighting of a need to stop. At 30 miles per hour, that same driver will need 178 to 196 feet to stop, or at least 66 percent more distance. Since traditional neighborhood development clearly involves the mixing of pedestrians and motor vehicles, and the encouragement of pedestrian travel, the motor vehicles must be forced by design and legislation to travel slowly, except along through roads, for safety reasons alone.

It is easy to become "lost" in the formulae associated with road geometry. It is important, however, to consider a certain parameter exists and how its use and interpretation will affect the users of the road. For example, roadways are superelevated to oppose the effects of centrifugal force on occupants of vehicles when traveling around a curve. The higher the speed, the more need for a bank to oppose the greater centrifugal force. Carried to the ultimate, a roadway will become nearly vertical (i.e., the Mercedes Benz test track), but then is hardly suitable for any purpose other than very high speed travel. In fact, superelevated roadways tend by design to encourage faster travel because unless one travels at the design speed (which is usually greater than the posted speed), the effect of the superelevation is not adequately opposed and the superelevation, provided for comfort, is not comfortable.

Minimum centerline radii and many other design parameters are often established with the belief that design speed and travel speeds can or should not be less than 25 to 35 miles per hour. As pedestrian environments do not easily tolerate vehicular speeds of more than 20 miles per hour, it is illuminating to compare the design differences for minimum centerline radii as is related to design speed:

DESIGN SPEED (in MPH)	MINIMUM CENTERLINE RADIUS (no superelevation)
10	25′
15	45-50′*
20	89′
25	165′
30	275′
35	415′
40	600′

Another factor related to design speed and minimum centerline radius computation is "side friction factor." The side friction factor is a number that relates to the limit of sideways force that a tire will bear without skidding, again while traveling around a curve. In conducting the initial research to determine this factor, tests were conducted and speed/radius relationships developed. This research resulted in another definition of side friction factor, which is "the point at which the centrifugal force is sufficient to cause the driver to experience a feeling of discomfort and cause him to react instinctively to avoid higher speed (emphasis added)." If smaller radii are provided, side friction factors will, therefore, cause an instinctive reaction to slow down. Obviously, designers cannot provide a mixture of criteria, such as placing a slow speed section of road geometry between high speed sections, which is unsafe; but the traveled radius should be recognized as a powerful design tool to slow vehicles down.

Since many of the pedestrian scaled criteria result in narrower streets, dead-end streets should be avoided and off-highway interconnections of streets and properties should be encouraged. The concept is that more slower moving streets can carry fair volumes of traffic, and motorists and pedestrians alike will have many optional routes of travel, as opposed to overloading a central collector. The ubiquitous urban "grid" serves these purposes well.

The Pedestrian Perspective

To encourage pedestrian travel, pedestrian routes must be safe, visually interesting, and provide convenient routes of travel for the user. As they are unfettered by the need for asphalt to determine their specific routes of travel, pedestrians as a whole will, even contrary to the law in some instances, travel to points of interest along routes of convenience regardless of where routes for travel or crossings may otherwise be designed or located. The elderly and the very young pedestrians are even more unresponsive to legislative efforts and rules to control them; they can only effectively be managed as pedestrians through design and recognition of their characteristics.

* while slower speeds allow higher side friction factors, for design purposes the maximum side friction factor is assumed to peak at 20 MPH; the greater the factor, the smaller the allowable radius (0.3 - 50′ radius).

Buildings that are regularly aligned with streets and sidewalks are one element necessary to form street spaces which afford a sense of place. Street rights-of-way that comprise straight-line segments allow buildings to remain aligned and also can create prominent locations for civic buildings or other important focal points of a community. Curved street rights-of-way, while presenting certain other design possibilities, do not generally afford the sense of place that can be achieved with straight-line rights-of-way. An exception is the traffic rotary, or round-about, which can provide a focal point and slow traffic while maintaining a relatively high capacity if properly designed.

Streets, when considered from the viewpoint of the pedestrian, are workable or not workable based on the cumulative effects of many design elements each of which, alone, may seem of little significance. However, pedestrians traveling at 2.5 to 6 feet/sec (0.7 to 1.6 miles per hour) have the time to note every detail. It is at pedestrian speeds and scale that details such as curb radii at street intersections develop an importance beyond merely providing some grade separation and a drainage route.

The greater the curb radius, the greater the length of the crosswalk needed to cross the street at that point. To illustrate, a 30-foot curb radius will require 24 more feet of travel than a 10-foot curb radius at a 90-degree intersection (more at other angles). This is nearly 10 seconds more crossing time for some pedestrians. Despite the effect of discouraging crossing by some pedestrians altogether, greater crossing times mean pedestrians will be in vehicular areas (the street) for longer periods of time which, of course, is unsafe. It is recognized that curb radii may be smaller due to lower operating speeds, and the street and development standards of many municipalities allow curb radii of 10 feet to 15 feet. However, even with 25-foot curb radii, and two 12-foot travel lanes, WB40 and WB50 trucks (large dump trucks) will encroach on adjacent lanes when making a right-hand turn. Encroachments in the oncoming lane can be tolerated where drivers of the trucks are made to wait, and at signalized intersections, stop lines can be set back to provide additional turning room.

Related to smaller curb radii, and also to the inter-relationship between cars and pedestrians, is the issue of on-street parking. Parallel on-street parking serves several beneficial functions in a traditional neighborhood. Cars parked parallel on streets provide a real measure of protection for pedestrians from moving vehicles and this is perceived by pedestrians as they use the adjacent sidewalks. Additionally, on-street parallel parking tends to slow down the moving vehicles as both the vehicular maneuvers required to park in parallel fashion and the possibilities of opening doors tend to slow drivers down naturally. On-street parking also provides additional turning room at street corners, particularly for vehicles making right-hand turns, when the on-street parking itself is not permitted immediately at the intersection, but the width for that parking is maintained. While (from an urban design perspective) bulk parking in the form of parking lots is best provided mid-block or within properly controlled parking structures, providing on-street parking can also afford the opportunity for some drivers to experience that small "victory" of securing an on-street parking space.

There is, obviously, a limit to the land area that can logically be termed a "pedestrian neighborhood." It is generally recognized that most Americans will tolerate a five-minute walk, provided it is a safe and interesting route, as has been previously noted. Depending on how one configures the shape of a neighborhood bounded by a five-minute walk, the area enclosed will vary somewhat, but 80 acres is an approximate median result. Eighty acres is also generally accepted as a manageable and historic size for a pedestrian neighborhood. Interestingly, 80 acres is also the land area enclosed by a circular highway at a 55 mph design speed - a mathematical, indeed perhaps a natural, indication that higher speed roads should exist between or around towns and not within them.

CONCLUSION

The travel speed of humans, at 1 to 3 miles per hour, does not mix well with motor vehicles, unless the vehicular design speeds do not exceed 20 miles per hour. Simply put, the geometric requirements for the motor vehicle at higher speeds destroy all possibilities of safe and convenient pedestrian movement. To say that designing accommodations for the pedestrian will be an easy matter would simply not be true, but this difficulty has long been recognized. Quoting from AASHTO, "it is often extremely difficult to make adequate provisions for pedestrians. Yet this must be done, because pedestrians are the lifeblood of our urban areas, especially in the downtown and other retail areas. In general, the most successful shopping sections are those that provide the most comfort and pleasure for pedestrians."

As designers, we all must recognize the needs of the pedestrian, in balance with motor vehicles, and we must be prepared to face the difficult design challenges that they present. If we do, the traditional neighborhood style of development can return and present a wonderful alternative to suburban sprawl, where people are forever doomed to a hermetic, and frenetic, life dependent on motor vehicles.

TABLE 1. NEO-TRADITIONAL NEIGHBORHOOD DESIGN PROJECTS

STATE	PROJECT	LOCATION	TOTAL ACREAGE	Mid-1991 STATUS
ALABAMA	BLOUNT SPRINGS	Blount Springs	3,500	construction
	TANNIN	Orange County	60	construction
ALBERTA	EAST MCKENZIE	Calgary	2,500	permits pending
BRITISH COLUMBIA	BAMBERTON	Victoria	21,900	permits pending
CALIFORNIA	ARLINGTON PARK	Sacramento	51	preliminary planning
	CALVINE ROAD-HWY 99	Sacramento	615	preliminary planning
	CAPITAL RIVER PARK	Sacramento	51	preliminary planning
	EAST ELK GROVE	Sacramento	1,400	preliminary planning
	LAGUNA WEST	Sacramento	800	construction
	MARIN CITY MASTER PLAN	Marin County	40	unbuilt
	MERCED VILLAGE	Merced County	8,000	preliminary planning
	NANCE CANYON	Chico	3,050	on hold
	NORTH PARK VILLAGE	Merced	398	preliminary planning
	OTAY RANCH*	Otay Mesa	23,000	general planning
	PITTSBURG NEIGHBORHOOD	Pittsburg	29	unbuilt
	PLAYA VISTA	Los Angeles	900	in design
	RIO LINDA ELVERTA	Sacramento	6,000	preliminary planning
	SOUTH BRENTWOOD VILLAGE	Atherton	141	permits pending
	SUTTER BAY NEW TOWN	Sutter County	25,000	planning
CONNECTICUT	GAYLORD HOSPITAL	Wallingford	343	unbuilt
FLORIDA	AVALON PARK	Orlando Park	9,400	construction imminent
	LEXINGTON PARK	Polk County	10,000	permits pending
	MARINELAND	Flagler County	140	permits pending
	NASSAU FOREST	Fernandina Beach	586	on hold
	OVIEDO NEW TOWN CENTER	Oviedo	140	planning
	RANCHO DEL SOL	Martin County	2,700	unbuilt
	SAILBOAT BEND	Ft. Lauderdale	180	permits pending
	ST. LUCIE WEST	Port St. Lucie	4,500	unbuilt
	SEASIDE	Florida Panhandle	80	construction
	STUART	Stuart	800	construction
	VIERA TOWN CENTER	Brevarde County	4,000	construction
	WELLINGTON	Palm Beach County	1,500	construction imminent
	WINDSOR	Vero Beach	400	construction
INDIANA	DEERFIELD	Merrillville	40	on hold
MAINE	INGRAHAM CORNER	West Rockport	100	permits pending
MARYLAND	CRAB CREEK	Annapolis	174	unbuilt
	KENTLANDS	Gaithersburg	356	construction
	SANDY SPRING	Sandy Spring	400	permits pending
MASSACHUSETTS	LENOX SOUTH	Lenox	63	permits pending
	MASHPEE COMMONS	Cape Cod	278	construction
MISSOURI	THE GATE DISTRICT	St. Louis	440	permits pending
NEW HAMPSHIRE	BEDFORD 3 CORNERS	Bedford	120	unbuilt
	BOWMAN GREEN	Bedford	14	unbuilt
	RIVERLANDS	Bedford	100	unbuilt
NEW JERSEY	TRENTON	Trenton	640	in progress
NEW YORK	ATLANTIC TERMINAL	Brooklyn	12	preliminary planning
	SOUTH HILL	Ithaca	325	on hold
	STURBRIDGE	Rochester	58	unbuilt
TEXAS	FRIDAY MOUNTAIN	Austin	500	unbuilt
VIRGINIA	BELMONT	Loudoun County	273	construction imminent
	BOULDER	Stafford County	950	general planning
	HAYMOUNT	Caroline County	1,582	permits pending
	NICHOLSON QUARTER	Williamsburg	28	unbuilt
WASHINGTON	NORTHWEST LANDING	Dupont	2,100	preliminary planning

*NTNDs are among the alternatives being advocated for this project

TABLE 2. COMPARISON OF TRAFFIC ENGINEERING AND RELATED DESIGN CHARACTERISTICS

TRAFFIC ENGINEERING DESIGN CHARACTERISTICS	STANDARD RESIDENTIAL POD	NEO-TRADITIONAL NEIGHBORHOOD
Street Layout		
Basic layout	Hierarchical layout designed to collect and channelize trips	Interconnected network of streets dispersing trips
Use of alleys	Often discouraged, especially in residential areas	Encouraged to accommodate narrower lots and fewer driveways on local streets which allow for narrower streets
Street Design		
Design speed	Typically 25-30 mph minimum, designed to recognize 85th percentile rate of travel	Typically 20 mph minimum, with design elements to assure design speed equals travel speed
Street width	This, and design speed, are determined by projected volumes and types of all of the users of the street	Determined by projected volumes and types of all of the users of the street
Curb radii	Generally selected to ensure in-lane turning movements for all types of vehicles	Selected considering impacts on pedestrian street crossing times and types of vehicles expected to generally use that street
Intersection geometry	Designed for efficiency, speed of vehicular travel, cost of operation and safety	Designed to discourage through traffic, highlight civic buildings and safety
Street trees and landscaping	Where allowed, strictly controlled as to size and location	Encouraged to form part of the street space. Larger sizes and small clearances encouraged.
Street lighting	Few, large, high and efficient luminaires	More and smaller streetlights of lesser wattage and scale
Sidewalk width and location within the street ROW	Typically 4' minimum; in many parts of the country, encouraged outside the ROW or to undulate	5' minimum, generally within ROW and parallel with the street
Building setbacks	Typically 15' or more	Typically no minimum
Superelevation	Sometimes required for streets under 40 mph design speed	Never a part of design for streets under 40 mph design speed
Construction centerline not always coincident with design	Not permitted	Encouraged where it serves to form vista terminations
Parking	Off-street preferred, but often located between buildings and the adjacent street.	On-street encouraged and counted toward minimum parking requirements; off-street generally located mid-block or to the rear of buildings.
Trip Generation	Developed from a sum of the uses; few "captured" trips	Develops from lesser need for vehicular trips; greater in-project opportunities for "captured" trips

NEIGHBORHOOD ECONOMICS: COMMENTS ON THREE CONCEPTUAL DEVELOPMENT SCENARIOS

ZHA, Inc.
Annapolis, Maryland

INTRODUCTION

Following up on a worksession with the team of consultants in December, this section provides comments from an economic perspective on the three "conceptual development scenarios" that were discussed. These scenarios were created to generate new thinking on how to use regulatory powers to enhance the pedestrian environment of new development in Montgomery County.

Background Material

The economics of development in the three examples are reviewed in this section. The following documents gave some background on issues associated with the plans and implementation:

- Germantown Master Plan documents, including a Technical Appendix with some information on market demand.
- Memo from Ben Bialek on Tax-Incentive Financing (Re: Shady Grove).
- OPP Memo on Infrastructure Financing.

General Principles

There are certain general principles that apply to the economic issues in the process of design modeling as it is done here and are generally relevant, to some degree, to the three different types of neighborhoods. Rather than repeat them with reference to each case, they are stated generally as follows:

a. The "market area" is larger than the geographically defined planning areas; in addition to walk-in customers, there will be pass-by traffic from other neighborhoods where commercial services are lacking. The boundaries in the three models are just property or tract boundaries that have little to do with "market area" or economic support.

b. The emphasis on walking traffic related to transit is understandable; this focus, in some cases, limits the economic attractiveness of certain types of projects to small-scale and low-profit businesses. The trade-offs may be acceptable, in some cases, as long they are made consciously.

c. The phasing of development in the more heavily urbanized areas will require build-out over a period of 20 years and longer; the plans should have flexibility to respond to market changes. The Shady Grove area is comparable, in some ways, to a highly developed urban center such as Bethesda, and initial uses may evolve into other forms as infrastructure (e.g., the light rail) is added over the years. The market will evolve at the same time.

d. The plans should provide for opportunities to combine public and private uses - for example, a library or a recreation center might make a good component of the Clopper Village or Shady Grove plans. These public uses generate traffic and synergy that is beneficial from both the public and private perspectives, and they can be integrated with retail or service centers.

e. While locating retail to orient it toward the pedestrian environment, the goal to strive for is to give it the best possible exposure with respect to local vehicular/pass-by traffic. The idea of a pedestrian oriented neighborhood is outstanding, but it will not hurt to keep in mind that the basic orientation of retail development is vehicular.

NEIGHBORHOOD TYPES

These principles of development economics and other observations are applied to the three different examples of pedestrian oriented environments, as discussed below.

Example I - Shady Grove Mixed-Use Neighborhood

This prototype provides fairly intense commercial and residential development in the immediate vicinity of the Metro station. The existing Metro system, as well as the potential for a light rail connector in the future linking the Shady Grove station with a major employment center a few miles away, suggests strong economic support for a very intense level of activity.

The residential density and development pattern (1,700 units) seem to work well in this scheme. High-density complexes could be accommodated closer to the Metro station itself, allowing a density that is somewhat higher, overall. The amount of commercial space (2 million square feet) would seem very low in view of the exceptional location, comparable to that of Silver Spring or Bethesda. Future phases should allow for more intense commercial development. Greater densities will yield higher returns on commercial development and make it possible to achieve higher quality in residential and open space components of the project.

The open space corridor extending away from the Metro station should be narrowed to reduce distances between retailers on either side and from the station itself. This would allow for street-oriented retail and facilitate shared/overlapping parking arrangements.

The neighborhood extends far enough away from the Metro station and there should be some neighborhood-serving retail space (e.g., convenience store, cleaners) several blocks from the station. Also, retailing at street level on the corridor that takes one away from the station and "back" into the residential area would enliven the pedestrian route.

This is a place where existing parking district legislation could be used to make stronger pedestrian connections. The approach used in Silver Spring and other CBD's in the County that gives developers a choice between providing on-site parking and paying a surcharge tax for shared parking could be applicable. This is also a case where tax-increment financing could facilitate much more attractive infrastructure development and common area improvements. The Bialek memo on financing is pretty much on target, except that more states use this approach than Bialek indicates.

Example II - Clopper Village

The concept plan shows an opportunity for a small shopping center adjacent to a neighborhood of 575 dwelling units. The commercial program provides for 40,000 square feet of office, in addition to 150,000 square feet of retail uses.

The commercial area has a good relationship to the community as well as to the major road, Great Seneca Highway. Several points should be considered regarding the commercial space:

a. Office Space/Design - The office space/design provides for a free-standing building, probably of four to five stories. This might work as a bank building or, perhaps, a professional building, depending on exact location and market demand. It would make a nice windfall for the property owner, though it probably would not add much to the pedestrian orientation. As an alternative, some office space on a second floor over the retail (instead of residential over the retail), with an orientation toward dental, financial, etc., is recommended. The dentists will not walk to work but the patients will stumble in for their root canals.

b. Retail Area - The level of retail in the program is not supported by households in the neighborhood itself (general principle number one). As an example, Giant, Inc., seeks roughly 3,5000 households as a threshold for a typical store site. This means that off-site traffic is very important to the success of the commercial area.

The civic spaces are shown set apart from the retail area. These can be integrated better to accomplish a number of purposes, including consolidating trips, sharing parking at certain times, reducing short drives for lunch, and generally concentrating support for certain retail and office components. The civic-retail makes a more viable combination than residential-retail.

The townhouses with a detached garage would probably fare better in this more urban setting than in the Conley Farm location, discussed below. Even in this case, town-houses with first-floor garages rather than detached garages are recommended. Allowing people to enter their homes directly from their vehicles works in Old Town, Alexandria, probably because of the security factor, and might be attractive in this setting.

Example III - Conley Farm, Fairland

The plan provides for a low-density neighborhood (four dwelling units per acre) with all homes accessible to a feeder bus system. The small, convenience retail is a free-standing store that serves the neighborhood.

The 90-acre tract is well located for the type of development proposed. It might make more sense to build a combination of townhouses at 10 to 12 per acre, and single-family units at four per acre, thus achieving greater density. However, one-family attached units have been included to attain a greater mix and a larger component of more "affordable" units. This is an "imposed" solution rather than a developer choice, but it could be workable.

There is a program component of 1,500 square feet of retail space. This is, in theory, supportable by 400 dwelling units, although it would require a full capture of nearby potential business within the neighborhood. The "catchment" ought to include a residential population within a primary market area and a secondary market area. The extent of capture of spending in these geographic areas will be determined for the most part (other things being equal) by two factors: distance to the store site and location of competitive stores.

To illustrate, a 1,500-square-foot retail space at $200 per square foot annual sales (the average tenant sales in a neighborhood shopping center for a center of 64,000 GLA) would indicate total sales of $300,000. A neighborhood of 400 households, expending 2 percent of total income on convenience store goods, would generate sales of $400,000 (assuming annual/household income of $50,000). The assumptions would need to be checked in relation to the population, and the capture of spending from the surrounding area would be factored into the calculations.

The success of the retail site will be very sensitive to its site plan in relation to the adjacent road and the larger intersection. While it should be set back and landscaped in front, the facade ought to be visible and parking should be convenient. In the worksession, a number of approaches were discussed that would probably be acceptable to a small retailer.

"Back Bay" townhouses may be hard to sell in this suburban environment; it may be better to find a way to attach the garages to homes, or build them into basements, and make the alley into a pedestrian path.

A possible connection between required civic space and the existing Conley House was discussed. Making the house a stronger focus or center of activity for the community might make it somewhat easier and more cost effective to preserve.

CONCLUSION

In conclusion, the three models all have certain strong features that need to be adjusted according to actual market conditions. The economics of retailing that enhances the pedestrian environment require a new way to look at suburban residential development.

EUROPEAN EXAMPLES: CREATING URBAN QUALITIES IN SUBURBS

Peter Breitling
Graz, Austria

INTRODUCTION

As part of the team of consultants selected for the Transit and Pedestrian Oriented Neighborhood Study, Peter Breitling of Graz, Austria provided experiences from Germany and Austria. This paper was translated from Breitling's work for the study, and its main points include the description of basic principles, identification of factors that establish neighborhood size and structure, and strategies for the creation of transit and pedestrian oriented neighborhoods with urban qualities in Germany and Austria.

FUNDAMENTAL PROBLEMS OF THE SUBURB

Urbanization in the Pre-Automobile Era

Urbanization in Europe is by no means a new phenomenon. By 1850, England was already 50 percent urbanized, and Germany was 45 percent urbanized by 1900. During the last half of the 19th century, many European cities grew at a tremendous rate. As an example, Berlin had a population of 600,000 in 1860, and by the turn of the century, it had over 3,000,000 people. The metropolitan areas of Europe were extremely dense. The usual housing type on most of the continent was a "closed block," four-to five-story apartment building with interior courtyards. On the other hand, density in Britain and the Netherlands was very low around 1900 because speculative developers built almost exclusively single-family rowhouses.

In Germany, only the city of Bremen resisted the "closed block" configuration and continued building English-style rowhouses, as evident in the Bremen facades of 1870-1910 with the private rear gardens. Some cities, such as Graz, Austria, where the "closed block" configuration was the norm, had much lower densities than Berlin or Vienna. In Graz, the center of city blocks were maintained as green space instead of building coverage. Because the boom of the Victorian Era was concentrated in big cities and industrial regions, many small towns remained unchanged and today represent a unique heritage in urban form. Strange as it may seem today, planners in the 1950's considered these "closed block" 19th century neighborhoods candidates for demolition.

The great population densities of Victorian Era cities were not only due to the concentration of housing but also to the very efficient size and close integration of public services which are still located around many 19th century primary schools. Places like Hyde Park and Luxembourg Gardens illustrate the exciting contrast created by the juxtaposition of 19th century urban residential structures and large, green, open spaces. The city of Graz is also a good example. This contrast is an important urban quality to retain, and it also indicates that the built area must be sufficiently dense to merit the dedication of a large open space. Providing effective public transportation in 1900 was not a problem as demonstrated by the metro, trolley, and bus networks of the era.

As many advantages as the 19th century city may have had in the judgement of its contemporaries, its density and over-crowding were often viewed as sinister and overwhelming to the residents.

Anti-Urban Concepts of Utopia

In 1874, Arminius (pseudonym of Countess Dohna Poninsky) proposed "bursting open" the big cities. The well known concepts of Ebenezer Howard were also emulated by German Gheodor Fritsch's work, entitled "Garden City." By the 1920's, the Utopian proposals put forward were not as consistent as the earlier notion of "closed blocks." Le Corbusier's ideas, for instance, tended to be very large scale, with a stated intent to avoid "corridor streets" and to disconnect building masses, breaking open the "closed blocks" of the old city concept.

Post World War II

After World War II, many architects proposed burying the old city pattern of "closed blocks," using the war damage as an opportunity to create something new. The general goal of German planners was to place developments in a landscape similar to the suburbs of the United States.

The British turned this anti-urban movement into an efficient New Towns Act. In Germany this philosophy was theoretically popular but not put to use. Although the detached house was not specifically advocated, the general new town concept was used as a pretext for the destruction of the city as it was known. Ideal new towns such as those presented at the 1957 International Building Exposition in Berlin were never realized.

A wave of Utopian city models emerged in the 1960's, including a whole variety of metabolistic, structuralistic, and other concepts. Examples were submarine cities, meta towns, and clip-on, funnel, bridge, and tower cities. While these concepts were not low-density or necessarily intended for pastoral settings, they were also not urban.

Structural Changes in European Cities After World War II

Changes in the post World War II European city were dramatic. Some of the predominant characteristics were:

a. boundless growth

b. sprawling, low-density development

c. loss of the fine grained diversity of building types and heights densely grouped together in the "closed block" configuration

d. widening of streets and squares

e. loss of the "street wall" and building block pattern

f. loss of human scale and increase in the use of high-rise development.

The net effect of all the changes in form and layout was a chopped up, dissipated, and monotonous city, the "placeless urban realm" as it was characterized by Melvin Webber 20 years ago.

Scattered Central European Urban Developments in 1990

Urban sprawl in Austria and Germany in the 1990's is characterized by structures being spread out over more land than previously. An observation is that the most democratic countries, with influential, local governments, often contain the most suburban sprawl. Another aspect of dispersed, lower-density building is isolation. Up until the early 1970's, a development would take up 100 percent of a site, and there was no coherence in the built environment. Where organized development took place, the dominant impression was its isolation. Even when attempts to concentrate population and create neighborhood centers were made, the overall environment remained incoherent and did not give rise to a sense of place.

Reasons for Suburbanization in Austria and Germany

a. Desire for Single-Family Detached Housing - The most important reason behind the move from the inner city to the suburbs was the desire to get away from densely populated, high-rise housing. Also, the illusion that the advantages of living in a rural environment could be enjoyed in close proximity to the urban core persisted for a long time. A country house in an Arcadian landscape was popularized in British architectural magazines with the caption, "Every Englishman's Dream." The affordable, relatively small, detached house is usually far from

the dream, but it is nevertheless alarming that if everyone had a house in the country, there would be no land left in Europe.

b. Increase in Personal Income - The second reason behind the rise in suburbanization is that prosperity and personal income have substantially increased. With rare exceptions, every German and Austrian can buy a car and purchase a house in the suburbs. The size of the average dwelling has also increased.

c. Use of Private Cars - The third reason is increased mobility provided by the private automobile, to the level of 450 cars per 1,000 inhabitants, almost as high as in the United States.

d. Rivalry Between Local Governments - A fourth reason behind suburbanization is the inability of local governments to stop the breakup of cities through strict development controls. Efforts by local governments are strongly affected by the rivalry of the surrounding smaller communities. Because the entire land area of Germany and Austria belongs to incorporated communities and even the smallest local government has the right to pursue its own annexation policy, there are many opportunities to compete with the central city. Under permissive development policies, almost all large German and Austrian cities decreased in population by 25-30 percent over the last two decades, and the suburban areas outside the city limits grew by the same percentage.

e. Tax System - The current system of taxation encourages suburbanization. A person living in a low density area outside Cologne, Frankfort, or Munich, for example, pays less taxes by commuting into the city in a car and has to spend more to take public transportation. A vehicle owner pays less automobile tax and insurance if the car is registered outside the city. Further, employers in the suburbs generally pay lower business taxes and enjoy other advantages.

By far, the greatest detriment to appropriate land use and development is the lack of an agricultural or open space reserve policy. A property owner can have agricultural or other low market value land rezoned to buildable land with great potential value without paying transfer taxes or getting a tax increase.

f. Planning Legislation - The sixth reason for increased suburbanization is inefficient planning. In Austria, local governments have been responsible for issuing building permits since 1962, and mayors could permit building without a comprehensive development plan or zone until the late 1970's. While planning and zoning have become more effective, a mayor still has the right to determine land use. This obviously places limitations on good planning, and, since regulation restricts the mayor's power to bestow favors, he or she has little motivation to encourage planning.

In both Austria and Germany, adopted density limitations are indicated in master plans and specific building plans. These limitations act as guidelines if no area plan exists. The guidelines prescribe a maximum density, and therefore, prevent excess densities in the CBD's, but do not address a <u>minimum</u> density in other residential areas.

The biggest restriction on current planning regulations is that they do not have the power of law. Local governments can choose to use the planning regulations without any obligation to do so. Since 1974, Graz has had no regulated development policy, even though it has the legal authority to provide planning legislation. Simple, straightforward planning policies are needed to clearly outline responsibilities and powers and, at the same time, motivate investors and communities towards environmentally sound decisions.

g. Lack of Incentive to Build in the City - An unregulated land market encourages suburban sprawl. There is no incentive to use or sell land zoned for building in the city. Many neighborhoods are not built out, and vacant lots often remain for 30, 40, or 80 years. This phenomenon is intimately tied to the system of taxation.

On the other hand, owners of agricultural land hope their property can some day be developed at a great profit. This hope is widespread and inflates the agricultural land market. As a result, farmers cannot buy arable land at a reasonable price. If farmers sell land, they normally put less desirable areas on the market first, such as wetlands, north facing slopes, and noise-impacted sites.

h. Housing Types - Lack of good housing types and floor plans is an eighth reason behind suburban sprawl. A majority of Austrians intend to build a single-family detached house or to buy a detached prefab house, because as far as other housing types are concerned, they are only aware of the widespread poor choices. Developer built rowhouses are considered unattractive, and the few good examples of low-rise, high-density attached housing often contain few urban amenities in comparison with single-family detached housing schemes. There are not enough exceptional examples to provide alternative solutions.

BASIC PRINCIPLES FOR CREATING LIVEABLE NEIGHBORHOODS

The Liveability of Urban Places

The Council of Europe proclaimed 1976 "The Year of Urban Renaissance." This campaign was very successful, and over the last 15 years, flight from the city core has been stopped.[6]

Some sectors remain with social problems, such as in Berlin, but in general, the new demand for inner city dwellings has not been jeopardized by crime or social tensions. In Berlin, there is no more crime in a 19th century, urban neighborhood than in a suburb. However, urban housing is affordable for only a very small percentage of the population.

Trends show that there is not only a demand for environmental quality (clean air and water, calm, sun, and private space), but there is also a latent longing for the special urban quality of life, which is not available in much of the suburbs.

The reasons behind suburban sprawl were discussed earlier, but repeating the prime causes is useful: Many people do not want to live in dense, high-rise housing and have the illusion that they can live in a pastoral home setting while enjoying close ties to the urban core.

A new orientation for development is needed. The liveable qualities of urban areas could be used to represent desired goals. A substantial change in planning and development is needed, if not an outright revolution without its extremes, to implement long term reforms.

Main Objectives of "Neighborhood Policy"

Consensus on general goals is a necessary precondition to the successful implementation of new planning principles. A "pride of place" is needed that includes preserving fine old structures or spaces as well as creating new places of merit.

Long, single-occupancy vehicle trips could be reduced by providing more services, but above all, by reducing the use of the automobile.

Activity and liveliness on town and neighborhood streets should be encouraged to provide animation and security.

Preserving vacant land regardless of its market value and establishing a low-rise, high-density housing policy are important objectives of the "neighborhood policy."

The main problem with the neighborhood unit concept is the conflict between two kinds of demands, which can be termed "optimal servicing" and "optimal environment."

a. <u>Optimal servicing</u> includes demands for:

- a full range of public services and institutions
- a great diversity in retail
- availability of work places

b. <u>Optimal environment</u> or liveability represents a demand for:

- protection from nuisances
- short distances to the neighborhood center and services
- freedom from danger in the residential environment
- choice in type of housing, with a great percentage of single-family detached units
- a small, liveable neighborhood
- an attractive town image

These two kinds of demands often compete, because the former requires a large area and high population and the latter calls for a small, easily comprehensible entity.

Basic Elements of Neighborhood Size and Structure

a. Accessibility

The size of a neighborhood depends on how far people are willing and able to walk. Ten minutes has often been published as a "reasonable walking distance." If an average walking speed of three miles an hour and a detour factor of 25 percent from the shortest route is assumed, a maximum walking distance of 2,040 feet can be reached. This can be translated into a circular shaped neighborhood of 300 acres. If the threshold of "reasonable walking distance" is raised to 15 minutes, the neighborhood can be expanded to about 675 acres.

b. Infrastructure and Services

All infrastructure and services, such as schools, retail, and community facilities, need a critical mass of users. Establishing thresholds for capacity utilization is difficult in Austria and Germany, but in general, the full range of daily services can be provided when 10-12,000 people are available. This is almost double the conventional neighborhood population for these countries. The question of what is a workable amount of services is related to location. Creating small neighborhood centers for every housing group in addition to centers for large communities has not worked. Larger neighborhood centers serving wider areas are more likely to cope with changes in social structure and habits.

c. Traffic and Transit Connections

One common planning objective is to arrive at a pattern that promotes a good public transit network. "Good" is equated with transit arriving near the home from the station at a minimum of 10-minute intervals. Similar critical mass figures used for service demand are used for transit. The following table is an analysis of critical transit factors from 20 years ago.

Economic Application of Public Transport Lines in Austria and Germany

	Bus	Tram	Metro	High-Speed Train
Capacity per hour	10,000	18,000	20,000	40,00
Inhabitants in the service area	50,000 -83,000	90,000 -150,00	100,000 -167,000	200,000 -330,000
Number of stations within the 30-minute range	25	25	15	10
Inhabitants in a station's catchment area	2,000	3,600	6,700	20,000

Today in Austria and Germany, a capacity utilization range in the upper figures or more is required. Economical metro service needs an average of 12,000 users in range of a station, and street car service requires an average 6,000-8,000. The public transit stations have to be located in the center of the neighborhood area to be served.

d. Density

Housing 10,000 people on 300 acres calls for a gross population density of about 10 units per acre in Austria and Germany (see graph and table on the following page for other examples). Population, walking distances, and size of the area of service were examined together to study their interdependence. The results showed that increasing the willingness to walk longer distances allowed a lower gross density. Under such conditions, even a gross density of five units per acre would be sufficient to house 10,000 to 20,000 inhabitants within the neighborhood unit. A fully served transit and pedestrian oriented neighborhood can be developed with single-family attached units, but not with detached houses.

e. Improving the Pedestrian Environment

Sociologists in Austria and Germany emphasize that the attractiveness of public walks and squares increases with the animation and activities provided by pedestrians. The design qualities of the outdoor spaces in a neighborhood are of central importance in promoting pedestrian movement. A study conducted in the early 1970's in Munich on the choice of routes for pedestrians indicated that even for the walk to work, pedestrians did not automatically take the shortest one but often chose the more attractive.

STRATEGIES FOR CREATING AN URBAN ENVIRONMENT IN SUBURBAN AREAS

Examples

Many German cities illustrate the validity of the above basic elements of neighborhood size and structure. Communities built around 1900, such as Neu-Westend Colony in Munich or the Bergmann Estate in Graz, show that a relatively high density can be achieved even with a high percentage of single-family attached homes. "New town" developments, such as Murkisches Viertel in Berlin, Hamburg's Steilshoop, Kirchheim bei Munchen and others, demonstrate that there are many possibilities for getting all inhabitants to the community center and establishing an attractive transit system within a comfortable walking distance.

GRAPH: WALKING TIMES, CATCHMENT AREAS, AND POPULATION DENSITY FOR AUSTRIA AND GERMANY

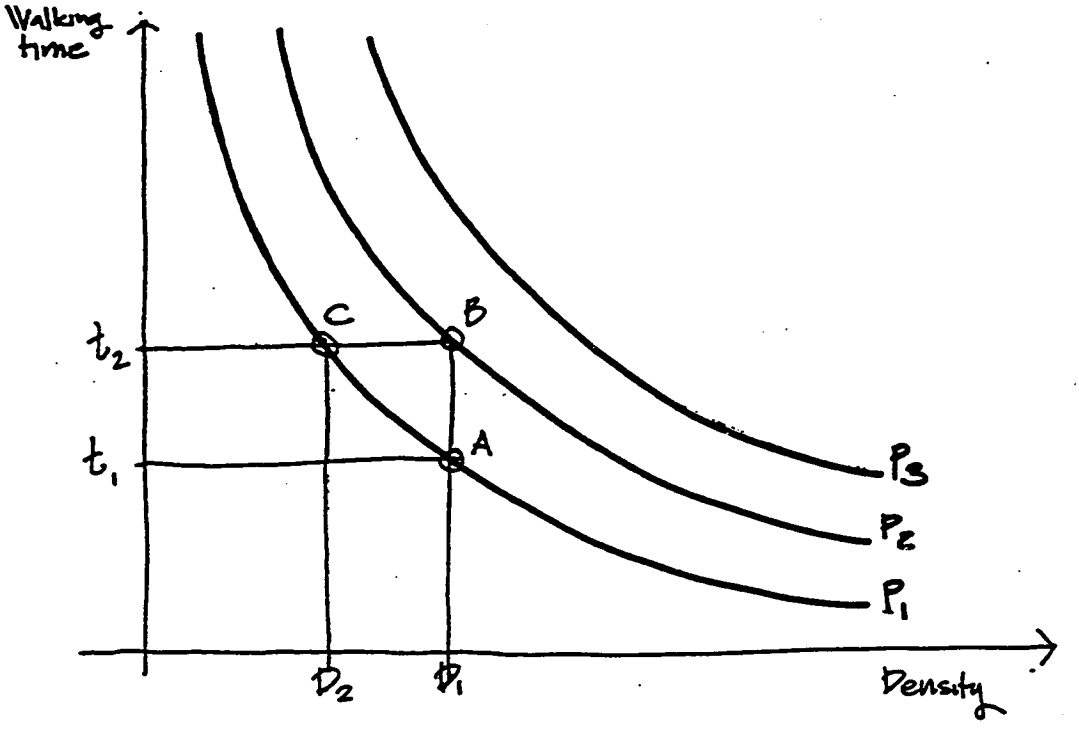


TABLE: WALKING TIMES, CATCHMENT AREAS, AND POPULATION DENSITY FOR AUSTRIA AND GERMANY

Walking Time (Minutes)	Radius[1] (feet)	Catchment Area (Acres)	Density[2] (Du/Ac) for Population Indicated	
			10,000 people	20,000 people
5	1020	75	40	80
10	2040	300	10	20
15	3060	675	5	9
20	4080	1200	3	5

[1] Radius based on walking speed of 3 miles per hour, and a detour factor of 25%.

[2] Density based on 3.3 people per dwelling unit.

Necessary Changes in Planning and Development

A review of suburban sprawl in Germany and Austria underlines the seemingly obvious fact that all of the elements of housing and neighborhood center design are interdependent and that no magical formula has been devised to overcome the environmental problems of the auto-oriented era.

However, adding up the elements of quality urban living provides a list of changes needed to arrive at a new planning orientation. The elements needed to create a policy of "reurbanization," or liveable neighborhoods, in Germany and Austria include:

a. Provide the full range of public and private services to the entire neighborhood,

b. Allow and encourage sufficient population in the neighborhood to ensure full capacity utilization of the services provided,

c. Provide all neighborhoods with attractive public transportation stations,

d. Ensure that transit stations and public services are within a comfortable walking distance from inhabitants,

e. Provide a reasonable building density around transit,

f. Do not allow arterial roads to cut through neighborhoods, urban centers, and other suburban areas,

g. Use land "reserves" in existing urban areas by building on vacant land,

h. Rehabilitate existing public spaces and buildings and especially historic town centers,

i. Give priority to pedestrians in the centers,

j. Create a wide variety of quality, single-family attached housing types,

k. Raise the demand for multi-story housing by improving the quality and layout of apartments,

l. Re-create the "closed block" housing development with a clear distinction between public and private space,

m. Encourage pedestrian movement by providing attractive connecting routes and sidewalks,

n. Improve the quality of connections from residences to the center,

o. Cluster services together to minimize walking distances,

p. Design with the whole townscape in mind,

q. Promote the use of transit by locating parking at some distance from housing,

r. Create a variety of attractive hard and soft urban open spaces.

CONCLUSION

While nothing is to be gained by overcrowding, there are great advantages to keeping people and their neighborhoods together in a cohesive and appropriately dense whole. A policy of promoting closely connected mid-sized towns and neighborhoods in Germany and Austria would retain the advantages of the big city while avoiding its shortcomings.

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List of Consultants

Sasaki Associates
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Kenneth Kreutziger,** AICP .... *Principle Investigator and Director*
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Alexandria, Virginia

Larry Miller

White Mountain Survey Co., Inc.
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Annapolis, Maryland

Thomas Flynn

Peter Breitling
Graz, Austria

Montgomery County Planning Department

Management

Robert W. Marriott, Jr. ..... *Planning Director*
Melissa Banach ..... *Deputy Director*
Charles Loehr ..... *Deputy Director*
Doug Alexander ..... *Chief—Design, Zoning, and Preservation*

Project Staff

John Carter ..... *Coordinator*
Marilyn Clemens
Jean Kaufman
Karen Kumm-Morris
Joan Simons*

Support Staff

Brooke Farquhar
Mary Goodman
Richard Hawthorne
Larry Ponsford
Margaret Rifkin
Patricia Willard
Robert M. Winick*

Technical Staff

Charles Coleman
Nam Hoang
Sheila Sampson
Frances Vaughn

* Former staff member
** Began assignment as a partner with Sasaki Associates, Inc. and subsequently became an independent planning and urban design consultant in Lexington, Massachusetts.

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